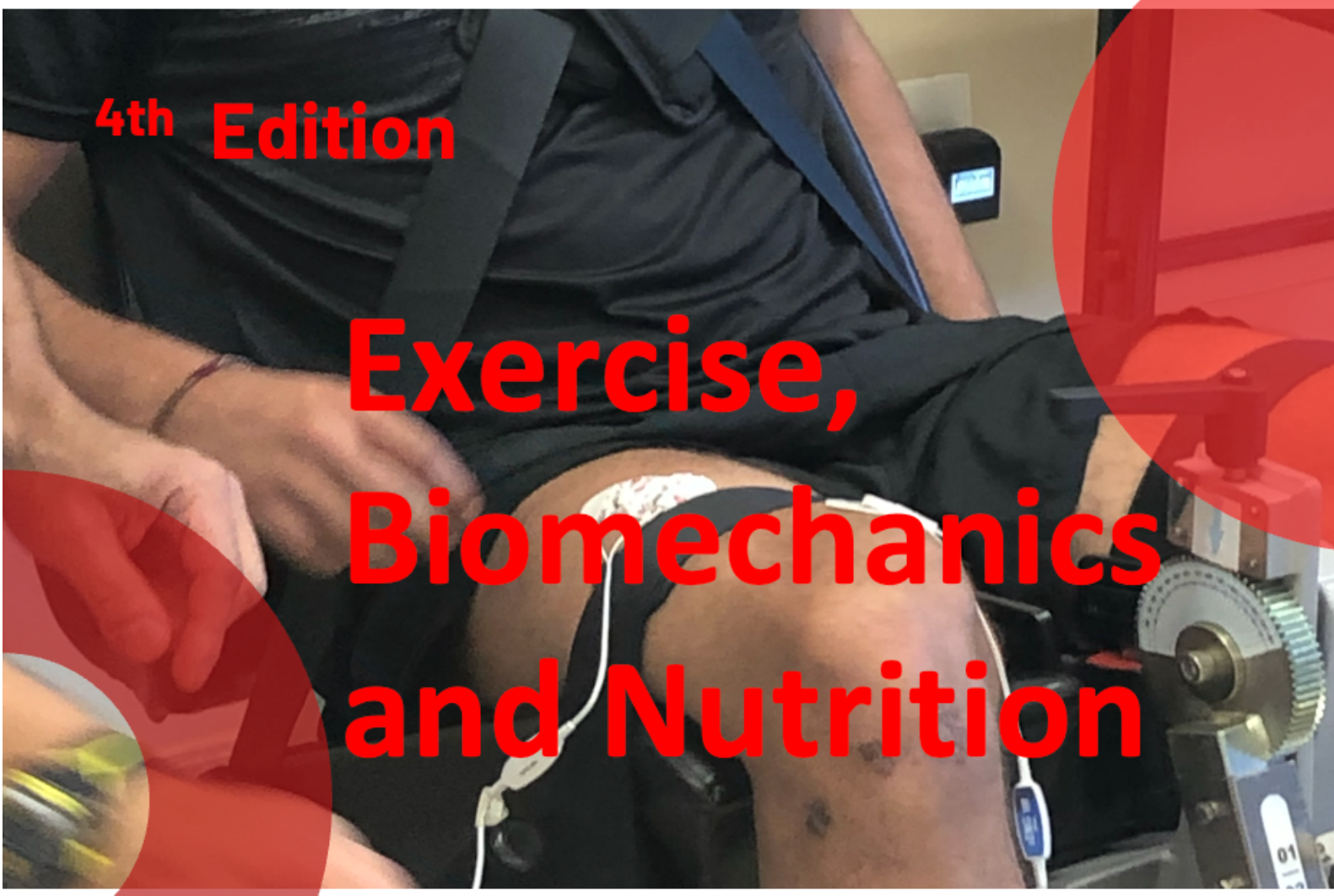

BOOK OF ABSTRACTS
2025

Editor: Leitão, L

EDUCAÇÃO
POLITÉCNICO SETÚBAL
SCHOOL · POLYTECHNIC UNIVERSITY

cieqv centro de investigação em qualidade de vida

FCT Fundação para a Ciência e a Tecnologia

Book of Abstrats

4th INTERNATIONAL CONGRESS EXERCISE, BIOMECHANICS AND NUTRITION – ESE/IPS
May 29 and 30 of 2025

Editor:
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Editions:
Instituto Politécnico de Setúbal – Escola Superior de Educação
Centro de Investigação em Qualidade de Vida

ISBN:
978-989-35809-7-4

Classification:
Digital

Funding:
FCT – Fundação para a Ciência e a Tecnologia, I.P./ Foundation for Science and Technology, I.P., Grant/Award Number UIDB/04748/2020 Life Quality Research Center (Centro de Investigação Qualidade de Vida)

Preface

Polytechnic Institute of Setúbal is emerging as a reference in the supporting and diffusion of scientific advances in Sports Sciences across the International Congress: Exercise, Biomechanics and Nutrition in a commitment with the academic excellence of their students and the scientific community.

The fourth edition of the International Congress: Exercise, Biomechanics and Nutrition reflexes the success of this scientific-technical-informative initiative that makes to this event as one of the most important from Portugal and the Iberian Peninsula. This event selected an hybrid format that interspersed conferences of contrasted speakers with oral communications of Degree student and consolidated research groups. Assistants to this events that exceeded 240 participants attended to the last advances in 3 well differentiated areas as Biomechanics, Exercise and Sport Nutrition divided in 11 conferences.

Conferences were presented by prestigious researchers from 6 different universities of 5 different countries as Polytechnic Institute of Setúbal (Portugal), University of Salamanca, University of Sevilla (Spain), Federal Institute of Minas Gerais (Brazil), University of Jyväskylä (Finland) and University of Suffolk (UK).

However, the most important area of this Congress was the number and quality of the oral communication presented, 94 in total. In this sense, the International Congress: Exercise, Biomechanics and Nutrition is one of the Congress with a higher number of works presented by Graduate students that it is in combination with the results of contrasted research groups, some of the references at international level that include researchers from eight different countries as England, Brazil, Spain, Portugal, Colombia, Italy, Iran and Turkey. Readers have the opportunity of supervising all these oral communication from the abstract presented in this Book of Abstracts.

Since the Organizing and Scientific Committees want to congratulate to all the researchers and attendees who participated in this third edition of the International Congress: Exercise, Biomechanics and Nutrition. In addition, to the external readers we invite to participate in the fifth edition that will be organized by Polytechnic Institute of Setúbal in 2026.

Índice

Congress Committees

Organizing Committee
Superior School of Education of Polytechnic Institute of Setúbal (ESE-IPS)

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Members: Teresa Figueiredo; Amílcar Antunes; Ana Pereira; Ana Cristina Figueira; Paulo Nunes.

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Congress Program

May 29, Thrusday

10:00 – Opening Session – ESE Auditorium
Angela Lemos | President of the Polytechnic Institute of Setúbal
João Pires | Dean of ESE-IP Setúbal
Luis Leitao | Professor at the Science and Technology Department of ESE-IP Setúbal

10:30 – *Physical Activity, Exercise and Nutrition* – ESE Auditorium Sedentary behaviors and prevention of musculoskeletal disorders in the working population. – **PhD Miguel Madruga, University of Salamanca, Spain**

11:20 – Sedentary behaviors and prevention of musculoskeletal disorders in the working population – **PhD Josué Prieto, University of Salamanca, Spain**

12:00 - Warming up: evidence and applications in sports training – **PhD João Ferreira-Junior, Federal Institute of Minas Gerais, Brazil**

13:30 – Lunch Break

14:00 – *Exercise and Biomechanics in sport* – ESE Auditorium WORKSHOP: Biomechanics and Nutrition in Endurance Sports in the Natural Environment – **PhD Miguel Madruga and Josue Prieto, University of Salamanca, Spain**

16:00 – Recents Advances in Sports Injury Rehabilitation: The Role of Blood Flow Restriction – **MsT Christian Castilla, Rehab fitness coach/ S&C coach, Spain**

16:30 – Considerations for criteria and exercise selection following a hamstring injury in football – **MsT Paolo Perna, Sports Medicine and Physioterapist, University of Suffolk**, **UK**

17:30 – Sports Injury Rehabilitation Round Table with Paolo Perna and Christian Castilla moderated by Javier Pecci, University of Seville, Spain

18:00- 19:30 Abstract/Video Oral Presentations I

May 30, Friday

8:00 – Abstract/Video Oral Presentations II

13:00 – Lunch Break

14:00 – Resistance Training in the female athlete: Physiological considerations – **PhD Std Vera Salmi, University of Jyväskylä, Finland**

15:00 – *Congress Closing Session*
Luis Leitão | Professor of Science and Technology Department at ESE-IP Setúbal
Raúl Dominguez | Professor in Sports at University of Seville

Abstracts

New Anthropometric Equations for Segmental Estimation of Fat-Free Mass in Physically Active Men

Nicolás Baglietto[1*]; Mario Albaladejo-Saura[1,2*]; Francisco Esparza-Ros[1]; Malek Mecherques-Carini[1]; Raquel Vaquero-Cristóbal[3]

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Introduction

Segmental estimation of fat-free mass (FFM) is essential in sports disciplines involving unilateral actions, where significant asymmetries in body composition distribution may occur (1,2). Although anthropometry is a widely used technique due to its accessibility and low cost, there are currently no validated strategies for estimating segmental FFM (3). This study aimed to develop prediction equations based on anthropometric variables to estimate FFM in physically active young men, using dual-energy X-ray absorptiometry (DXA) as the reference method.

Methods

A cross-sectional study was conducted with 157 physically active young adult men (22.3 ± 3.41 years), evaluated using standardized DXA and anthropometry protocols (according to ISAK standards) on both sides of the body. DXA was used to estimate FFM in both upper limbs, the trunk, and both lower limbs. Based on these measurements, multiple linear regression equations were developed using anthropometric variables, with DXA data as the reference.

Results and Conclusions

The equations developed using anthropometric variables showed a high predictive capacity across all body segments ($r2 > 0.750$) when compared to DXA. The most relevant variables for estimating FFM were body mass in the trunk, corrected arm girths in the upper limbs, corrected thigh and calf girths, and Ileospinale and Trochanterion heights in the lower limbs. In conclusion, the proposed equations provide a valid tool for estimating segmental FFM in physically active young men using anthropometry. This alternative proves useful in field-based settings due to its low cost, applicability, and availability, addressing a current limitation in regional body composition assessment through anthropometry.

Keywords: Body composition, fat-free mass, anthropometry, prediction equations

Comparison of DXA and BIA in the Estimation of Fat-Free Mass in Physically Active Young Adults.

Nicolás Baglietto[1*]; Raquel Vaquero-Cristóbal[2]; Mario Albaladejo-Saura[1,3*]; Malek Mecherques-Carini[1]; Francisco Esparza-Ros[1]

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Introduction

Segmental estimation of fat-free mass (FFM) is crucial in sports contexts, particularly in disciplines involving unilateral actions. Although previous studies have shown that dual-energy X-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA) are not interchangeable at a general level, doubts remain regarding the comparability of their results at the segmental level. This study aimed to compare FFM estimations between DXA and BIA across different body segments and to assess their level of agreement in physically active young adults.

Methods

A total of 258 physically active young adults participated (157 men, 101 women; 22.3 ± 3.41 years). FFM (kg and %) was assessed in both upper and lower limbs and the trunk using DXA (Hologic Horizon) and BIA (TANITA MC-780-MA), under strict hydration control conditions verified through urine specific gravity. ANOVA, Student's t-tests by sex, and Bland-Altman analysis were used to evaluate differences and agreement.

Results and Conclusions

Significant differences were found between DXA and BIA across all body segments and sexes for FFM estimation ($p < 0.001$), except for the right lower limb in women ($p = 0.154$). Bland-Altman analysis showed no agreement between methods in any body segment ($p < 0.001$), except for the right upper limb in women, where agreement was observed ($p = 0.167$). Overall, BIA tended to overestimate FFM in the trunk and upper limbs and underestimate it in the lower limbs. In conclusion, BIA cannot be considered a valid alternative to DXA for segmental estimation of fat-free mass in physically active adults. Moreover, comparisons between both methods should be avoided, as their results are not interchangeable.

Keywords: Segmental body composition, fat-free mass, DXA, BIA

Impact of Body Composition on Physical Performance in Elite Female soccer players

Alberto Roso-Moliner[1*], Demetrio Lozano[1], Rafael Albalad-Aiguabella[1], Oscar Villanueva-Guerrero[1], Antonio Cartón-Llorente[1] & Elena Mainer-Pardos[1]

[1]Faculty of Health Sciences, University of San Jorge, Zaragoza, Spain
*Correspondence: aroso@usj.es

Introduction

Introduction Football is one of the most widely played team sports globally. To reduce the gap between male and female participation, FIFA launched its Women's Football Strategy (1). The aim of our study was to analyse the influence of body composition on physical performance in female football players.

Methods

Methods Thirty-eight players from the Spanish Second Division took part in a cross-sectional study conducted during the competitive season. Body composition was assessed using standardised anthropometric techniques (2). Physical performance tests included the countermovement jump (CMJ), horizontal jump (HJ), linear sprint (40 metres), and the 505 change of direction test (COD) (3).

Results and Conclusions

Results The results showed significant correlations between body composition and linear sprint performance. A higher body fat percentage was associated with slower sprint times ($r = -0.47$ to 0.46 / $p < 0.05$). Conversely, greater muscle mass and fat-free mass were associated with faster sprint times and improved jump performance. No significant relationships were found between body composition and COD performance. Discussion These findings highlight the importance of optimising body composition and its influence on the physical performance of elite female footballers (4). We recommend that coaches and strength and conditioning professionals implement individualised training and nutrition strategies to achieve this.

Keywords: Keywords: soccer, change of direction, women, body composition, performance

Objective evaluation of padel performance: comparison between result-based rankings and computer vision systems

Sanchez-Trigo, Horacio

University of Seville, Spain

Introduction

Accurate assessment of amateur padel players' performance is essential to optimize training and ensure fair competition. Currently, result-based and self-assessed rankings, such as Playtomic, are subject to biases that compromise their objectivity. Artificial intelligence (AI) applications through computer vision offer a promising alternative by providing immediate and objective evaluations of sports performance.

Methods

A total of 180 non-professional padel players from 9 clubs in Spain were evaluated using three methods: a self-assessed, result-based ranking system (Playtomic), an AI-based system analyzing recorded matches (AIball), and assessments made by a panel of five expert coaches (used as the reference standard). Statistical analyses included Pearson correlations, Intraclass Correlation Coefficient (ICC), Lin's Concordance Correlation Coefficient (CCC), paired t-tests, Bland-Altman analysis, and error metrics (MSE, RMSE, and MAE) to compare the reliability and agreement between the methods.

Results and Conclusions

AIball demonstrated higher correlation and concordance with the coaches' evaluations ($r = 0.7769$; $CCC = 0.7144$) compared to Playtomic. It also showed lower prediction errors and greater classification accuracy. These results suggest that AI-based systems provide more objective and reliable player assessments than traditional self-assessment methods, with significant implications for improving training programs and standardizing amateur padel rankings.

Keywords: Artificial intelligence, padel, performance assessment, deep learning, player rankings

Validity of BIA for segmental fat mass analysis in young men and development of predictive models using anthropometry

Mecherques-Carini, M., [1]; Albaladejo-Saura, M., [1-2]; Vaquero-Cristóbal, R., [3]; Esparza-Ros, F., [1]; Baglietto, N., [1]

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Introduction

Accurate assessment of segmental fat mass is essential in health and performance fields, yet accessible methods have limitations. Although bioelectrical impedance analysis (BIA) provides regional estimates, its validity compared to methods like DXA remains under debate. Anthropometry, in contrast, offers a low-cost alternative with potential for segmental estimation in both clinical and sports contexts.

Methods

A sample of 161 young males (23.04 ± 5.61 years old) was assessed using DXA (GE Lunar iDXA), multifrequency BIA (TANITA MC-780-MA), and full anthropometric profiling according to ISAK protocol. Both sides of the body were measured using a Harpenden skinfold caliper, and all measurements were taken by a certified ISAK Level 3 anthropometrist. Differences between methods were analyzed using repeated measures ANOVA and Bland-Altman plots. Multivariate regression models were developed to estimate segmental fat mass from anthropometry, controlling for BMI and hydration status (via urine specific gravity).

Results and Conclusions

Significant differences were found between DXA and BIA across all segments ($p < 0.001$), with BIA overestimating limb fat and underestimating trunk fat. Anthropometric models showed high predictive capacity ($R^2 = 0.758–0.887$; $p < 0.001$). Key predictors included peripheral skinfolds for limbs and the left supraspinale skinfold for the trunk. It is concluded that BIA and DXA are not interchangeable for segmental analysis in young men, but anthropometry offers a valid, low-cost alternative.

Keywords: Body composition, segmental fat, bioelectrical impedance, anthropometry, DXA, young males

Boosting Confidence in Beginners: The Role of Instruction Type in Exercise Self-Efficacy during lifting tasks

Carnero-Díaz, Á., [1]; Pecci, J., [2]; Kaplánová, A., [3]

1. Department of Physical Education and Sport, University of Seville, Seville, Spain; 2. Department of Sport Science in Educology and Humanities, Faculty of Physical Education and Sports, Comenius University in Bratislava, Slovakia

Introduction

Self-efficacy is recognized as a key determinant of motivation, adherence, and motor performance in physical training, particularly among novice individuals. However, limited evidence exists regarding the influence of instructional strategies on this psychological construct during strength-based tasks.

Methods

A randomized crossover design was applied with 20 participants without prior strength training experience. Each subject completed deadlift trials under three conditions: analogical instruction (using metaphor-based cues), explicit instruction (technical, joint-focused commands), and a control condition without specific instructional guidance. Self-efficacy was measured immediately after each condition using a validated scale.

Results and Conclusions

Participants reported significantly higher levels of self-efficacy after receiving analogical instruction compared to both explicit and control conditions ($p < .05$). The effect was consistent across both sexes and was independent of physical performance metrics. Analogical instruction appears to enhance self-efficacy in novice lifters more effectively than technical cues or no instruction. These findings suggest that adopting metaphorical language may foster greater psychological readiness in the early stages of training. Implications extend to coaching, physical education, and rehabilitation contexts where early confidence is essential for sustained engagement.

Keywords: self-efficacy, instruction type, analogical cues, novice, resistance training, motor learning

Linking Physical Literacy to Mental Health

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Introduction

The concept of physical literacy has gained prominence in the context of adolescent health, with increasing evidence suggesting its potential as a pivotal factor in promoting adolescent well-being and physical activity. The objective of the current study was to examine the relationships between perceived physical literacy (PPL) and symptoms of depression, anxiety, and stress in Spanish adolescents.

Methods

This cross-sectional study involved 714 adolescents. Data were collected using the Spanish Perceived Physical Literacy Instrument for Adolescents (S-PPLI) and the Depression Anxiety Stress Scale-21 (DASS-21). Robust linear regression models were employed to analyze the associations between perceived physical literacy and mental health outcomes.

Results and Conclusions

After adjusting for various covariates, an inverse association was observed between S-PPLI scores and all DASS-21 domains. Higher perceived physical literacy was significantly linked to lower levels of depression anxiety and stress. Adolescents with higher PPL reported notably fewer symptoms across all three mental health indicators compared to those with lower PPL. Conclusion: Perceived physical literacy may be a protective factor against depression, anxiety, and stress in adolescents. Enhancing physical literacy could be a crucial component in leveraging physical activity to support adolescent mental health.

Keywords: Mental health;Physical education;Physical activity;Youth;Teenagers

Correlation between strength manifestations and functional capacity in older women undergoing traditional resistance training

Agostinho, P. A. G.; Bedoya, É. A. P.; Cota, A. R.; Chaves, S. F. N.; Leite, L. B.; Costa, S. F. F.; Benjamim, M. S.; Santos, M. L. C.; Barbosa T. L.; Vaz, A. R. C.; Oliveira, C. E. P.; Carneiro-Júnior, M. A.; Moreira, O. C.

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Introduction

The aging process, even in the absence of comorbidities, is associated with various physiological changes that contribute to the reduction of muscle mass, strength, and functionality. In this context, the adoption of effective prevention and intervention strategies is essential to preserve the health and well-being of the elderly population. Among these strategies, traditional resistance training has stood out due to its positive effects on neuromuscular function and functional capacity in older adults. Thus, this study aimed to investigate the correlation between muscular strength manifestations and functional capacity in older women living in the community of Viçosa who underwent a traditional resistance training protocol.

Methods

Eighteen older women participated in 16 sessions of the traditional resistance training protocol. The manifestations of strength were assessed through maximum voluntary isometric contraction, maximum dynamic strength (1RM), and muscle power at 40%, 60%, and 80% of 1RM on the bilateral leg extension machine. Functional capacity was measured using the Timed Up and Go (TUG) and the Short Physical Performance Battery (SPPB). The Shapiro-Wilk test was used to check the normality of the data. The Student's t-test compared the differences between muscular strength manifestations and functional capacity. Spearman's correlation was used to analyze their relationships, classified as: ≤0.30 (very weak), 0.31-0.50 (weak), 0.51-0.70 (moderate), 0.71-0.90 (strong), and ≥0.90 (very strong). The analyses were performed using GraphPad Prism version 8.01.

Results and Conclusions

The correlation matrix revealed significant associations between muscular strength manifestations and functional capacity. Performance on the SPPB showed moderate to strong positive correlations with all strength variables, being strongest with muscle power at 60% of 1RM ($r = 0.85$), followed by power at 80% ($r = 0.73$), indicating that higher levels of submaximal dynamic strength are associated with better overall functionality. The TUG negatively correlated with strength manifestations, particularly isometric strength ($r = -0.32$) and power at 40% of 1RM ($r = -0.38$), suggesting that higher levels of strength contribute to better functional mobility. These findings reinforce the importance of strength training, especially at moderate intensities, in promoting functionality in older women.

Keywords: Older women; Muscular strength; Functional capacity; Resistance training; Mobility.

Creatine as an ergogenic aid for returning to play in athletes with patellar tendinopathy

Sánchez-Gómez, A.,[1]; Malaguti, M., [2]; Sañudo, B., [3]; López-Samanes, A., [4]; San Juan, AF., [5]; Domínguez, R., [3]

[1] University of Córdoba, Spain; [2] University of Bologna, Italy; [3] University of Seville, Spain; [4] Universidad Pontificia Comillas; [5]Universidad Politécnica de Madrid, Spain

Introduction

A limited number of sports supplements have been identified as capable of enhancing sports performance directly or indirectly, favouring nutrients in situations without the availability of food, or treating or preventing nutritional deficiencies. However, there is limited data regarding the possible ergogenic properties of creatine supplementation for accelerating return to play for athletes with high-prevalence injuries such as patellar tendinopathy (PT).

Methods

Twenty federated male athletes diagnosed with PT were randomly assigned to a Creatine (CR, n=9) or a Placebo group (PLA, n=11). CR and PLA performed a rehabilitation program consisting of a training based on eccentric contractions (declined single squat) and stretching of knee extensors and flexors daily, and 5 sessions of manual therapy and extracorporeal shock wave therapy (ESWT) over 8 weeks. In that period, participants ingested 3 g/d of CR or PLA (sucrose). Before the start (PRE), at the 4 weeks (MID), and after finishing 8 weeks (POST), jump ability was assessed using a countermovement jump (CMJ), muscle strength (5-RM test involved the injured knee), and pain (VISA-P questionnaire). A repeated measures analysis of variance (ANOVA-RM) with adjustment of Bonferroni was performed using JAMOVI statistical software (version 2.3.28).

Results and Conclusions

For both groups a progressive increase in the 5-RM test ($F=79.25$; $p<0.01$; $\eta^2p=0.74$) was observed. Pain was also reduced along the intervention ($p<0.01$; $\eta^2p=0.63$), however, only CR was reduced statistically in MID (MID: 70.2 ± 13.3 points vs PRE: 60.6 ± 9.4 points; $t=-3.66$; $p=0.03$). Also, in the CMJ test CR improved its performance from PRE (34.3 ± 4.5 cm) to MID (36.8 ± 3.79 cm; $t=-3.81$; $p=0.02$), and to POST vs MID (POST: 37.6 ± 5.4 cm; $t=-3.93$; $p=0.02$). PLA did not show any improvement in vertical jump capacity ($p>0.05$). These results showed that the enhanced vertical jump capability might be associated with a reduction in pain, but not to the maximal strength. Therefore, CR could act as an ergogenic aid in athletes with PT facilitating the transfer of strength gains to functional movements involved in sports, such as jumping.

Keywords: Dietary supplement; Exercise; Injury; Nutrition; Performance; Sport

Influence of Triathlon Segments and Transitions on Elite Performance by Distance and Sex

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Introduction

Understanding the factors that influence elite triathlon performance is essential for developing effective training and racing strategies. This study analysed how performance across the different triathlon segments impacts the final outcome of elite athletes in short-distance competitions, taking into account sex, race distance, and performance level.

Methods

Results from 113 World Triathlon Series events (2017–2024) were analysed, including 19 Super-Sprint, 36 Sprint, and 58 Olympic-distance triathlons (n = 2004 women and 2113 men). Split times were normalised to a 0–100 scale to account for venue and environmental variations, and were analysed using general linear models and decision tree analyses.

Results and Conclusions

Running performance showed the strongest associations across all distances, with β values ranging from 0.13 to 0.39 for males and 0.07 to 0.23 for females, for Super-Sprint to Olympic races, respectively. Decision trees attributed 39%–67% of the final rankings to running for Top-10 finishers. While cycling's importance grows with distance, it remains less decisive than swimming for Top-10 female finishers (9%–21% vs. 23%–31%). Transitions, especially T1, had a notable influence on final positions in Sprint and Super-Sprint events, particularly among females (β = 0.13 and 0.07, respectively), but had minimal impact in the Olympic distance. T2 also contributed to Sprint performance in both sexes (β = 0.05). Our findings reveal that, as competition distance increases, cycling and running become more crucial, with running being the most decisive factor for both sexes. T1 performance is more influential for female triathletes, especially in shorter distances, whereas swimming has minimal impact for overall results, except for Top-10 female finishers.

Keywords: Swimming, Cycling, Running, Transitions, Competition Analysis

Safe or Dangerous? Evaluating Group A Sports Supplements in the Context of the Epithelial Barrier Hypothesis

Sadık, M., [1]; Aladağ, E., [1]; Bayraktar, B[., 2,3,4],; Sanchez-Oliver, A.J., 5; Günalan, E., [6]

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Introduction

The epithelial barrier hypothesis suggests that the integrity of epithelial barriers in the skin, respiratory tract, and intestinal mucosa contributes to various chronic diseases. Long-term and high-intensity training, dehydration, malnutrition, etc., can cause epithelial barrier sensitivity in elite athletes. Elite athletes commonly consume sports supplements (SS) to enhance performance, support physical appearance, and prevent nutrient deficiencies. Scientific evidence indicates that SS can also affect the integrity of epithelial barriers. This study aims to discuss the potential effects of SS classified as Group A by the Australian Sports Institute (AIS) on epithelial barrier integrity.

Methods

This study focuses on Group A supplements, which are supported by robust scientific evidence for application in defined athletic contexts, following evidence-based guidelines. In this context, the potential effects of sports foods, medical supplements, and performance supplements are investigated in the scope of epithelial barrier integrity, type 2 immunity, inflammation, mucosal barrier, and pathogen colonization.

Results and Conclusions

The effects of SS on the gastrointestinal system can vary considerably. Certain supplements, such as zinc, vitamin D, probiotics, protein, calcium, beta-alanine, creatine and nitrates, have reduced intestinal permeability and inflammation while increasing the expression of tight junction proteins. However, the unsupervised use of energy drinks, sports bars, gels, electrolyte supplements, and iron can contribute to adverse health outcomes due to damage to the epithelial barrier. Interestingly, studies regarding the impact of caffeine, glycerol and sodium bicarbonate on the integrity of the epithelial barrier present conflicting outcomes. These findings indicate that while Group A supplements are generally considered safe, their long-term effects should be reexamined, particularly on epithelial integrity. Further research is essential to clarify how frequently supplements influence the epithelial barrier, especially in elite athletes exposed to high physical stress.

Keywords: epithelial barrier, inflammation, sports, supplements, tight junctions

Sports Drinks May Affect Salivary Parameters in Adolescent Footballers

Bakdım, K., [1]; Yılmaz, Ş., [1]; Kement, S., [1]; Küçük, F.B., [2]; Sücüllülü, B.N., [3]; Yalvaç, S., [4]; Vural, Y., [4]; Saygılı, S., [4]; Özüpek, G., [2]; Özgün, M., [5]; Keskin, M., [6]; Özen, B., 1; Günalan, E., [7]

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Introduction

Many adolescent athletes turn to sports supplements (SS) to improve their performance. Still, the growing use of these products raises questions about how they might affect oral health in the long run. While most studies focus on adult athletes and link sports drink consumption to dental issues like erosion and decay, it is worth asking whether these problems could begin much earlier, during the teenage years. This study explored how supplement use may influence salivary characteristics and early signs of oral health changes in adolescent football players.

Methods

Participants' characteristics and use of sports supplements were collected from 52 adolescent footballers through a structured questionnaire. Dental caries experience was assessed using the DMFT index (Decayed, Missing, and Filled Teeth). Dental erosion was evaluated using two clinical tools: the Visual Dental Erosion Examination Index and the Basic Erosive Wear Evaluation. Salivary parameters were measured using the GC Saliva Check Buffer kit. Statistical analysis was conducted using Jamovi (Version 1.8).

Results and Conclusions

No significant relationship was found between regular SS use and the DMFT index or dental erosion. However, a significant association was only identified between sports drink consumption and resting salivary pH, stimulated salivary volume (mL), and stimulated salivary pH ($p < 0.05$). These findings suggest that, among supplements used during adolescence, sports drinks pose the highest risk in terms of salivary parameters. Early and frequent use of sports drinks may carry long-term consequences for oral health. Raising awareness among adolescent athletes is crucial, and offering safe hydration alternatives, such as mineral water, can be part of that effort.

Keywords: adolescent, football, sports, supplements, oral health

Physical and Performance Profiles by Playing Position in Elite Youth Futsal Players

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Introduction

Understanding physical and performance profiles by playing position in youth futsal is essential for optimizing training, guiding talent identification, and informing injury prevention strategies. Despite the sport's physiological demands, there is limited evidence analyzing differences between positions in youth athletes.

Methods

Ninety-eight highly trained U-19 futsal players (age: 17.3 ± 0.78 years) from the highest national level in Spain were categorized by position: goalkeepers (n=15), defenders (n=22), left wingers (n=16), right wingers (n=27), and pivots (n=18). Measurements included height, body mass, countermovement jump (CMJ), horizontal jump, 10-m and 25-m sprint times, and change-of-direction (COD) tests (COD180 and V-cut). One-way ANOVA with post-hoc Bonferroni tests assessed between-position differences ($p \leq 0.05$).

Results and Conclusions

Significant differences were found between playing positions. Pivots (179.4 ± 5.40 cm) and goalkeepers (181.8 ± 6.08 cm) were significantly taller than left wingers (173.7 ± 5.26 cm), right wingers (174.5 ± 5.52 cm), and defenders (175.4 ± 5.74 cm) ($p<0.05$). Body mass was also significantly higher in goalkeepers (78.3 ± 9.78 kg) and pivots (72.9 ± 3.97 kg) compared to other positions. In terms of performance, goalkeepers showed significantly slower times in COD180 to the left (2.76 ± 0.11 s) than all other positions ($p<0.05$, effect size = 1.32 to 1.89). Additionally, left wingers demonstrated better performance in the V-cut test (6.94 ± 0.17 s) compared to goalkeepers (7.17 ± 0.19 s). However, no significant differences were observed in countermovement or horizontal jumps, nor in sprint performance between outfield players (left/right wingers, defenders, pivots). Pivots and goalkeepers display distinct physical profiles, with greater stature and body mass, but lower agility and speed, particularly in COD tasks. Outfield players share similar physical and performance characteristics, possibly due to uniform training loads at this developmental stage. These insights may guide coaches in tailoring position-specific training programs in youth futsal.

Keywords: futsal, player profiling, youth athletes, physical performance, anthropometry, playing positions

Impact of resistance training volume on strength deficit

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Introduction

The strength deficit represents the relative difference between the force produced against the "one-repetition maximum" (i.e., 1RM) and any other load of lower magnitude (e.g., 10–95% 1RM). The most practical way to approach the quantification of this deficit is by measuring the velocity at which absolute loads are lifted in a progressive test. Once the 1RM value is known, absolute loads are converted into relative loads (%1RM). If velocities at each %1RM tend to increase, the strength deficit has decreased; conversely, if velocity decreases, the deficit has increased. A reduction in the strength deficit means that the athlete is able to apply greater force (in relation to his/her maximum capacity) at a given %1RM. Therefore, the purpose of the present study was to analyze the effect of resistance training volume on strength deficit.

Methods

Thirty-six resistance-trained men were randomized into three groups: low (LOW), moderate (MOD), and high (HIG) volume. All groups trained full squat twice a week, with relative intensities increasing from 70% to 85% 1RM over an 8-week training period. LOW performed only 3 repetitions per session; MOD completed 12, 10, 8, and 6 repetitions per session with 70%, 75%, 80%, and 85% 1RM, respectively; and HIG performed 24, 21, 18, and 15 repetitions per session with 70%, 75%, 80%, and 85% 1RM, respectively. Each session consisted of a single set with 10-second rest periods between repetitions to minimize fatigue accumulation during the training session. If the MPV difference between the fastest and subsequent repetitions was between 0.04-0.06 m·s−1, the inter-repetition rest period was prolonged to 20 seconds. If the difference was between 0.07-0.09 m·s−1, an additional 10 seconds of rest was added between repetitions, and so on. This was done to isolate the effect of the independent variable, that is, training volume.

Results and Conclusions
A significant "group × time" interaction was observed for each %1RM ($p < 0.01$), except for 95-100% 1RM, along with a significant time effect for all %1RM values except for 85–100% 1RM. The MOD group achieved statistically greater increases than the LOW group from 10% to 80% 1RM ($p < 0.001$–0.05). Therefore, a moderate training volume resulted in a reduction of the strength deficit.

Keywords: lifting velocity; training load; fatigue management; velocity-based training.

Larger Achilles and plantar fascia induce lower duty factor during barefoot running

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Introduction

Tendons play a crucial role allowing the storage and release of mechanical energy during the running cycle. Running kinematics, including duty factor, constitute a basic element of the runner's biomechanics, and can determine their performance. This study aimed to analyze the link between Achilles tendon and plantar fascia morphology and running parameters, considering the influence of wearing shoes versus running barefoot.

Methods

44 participants (30 men and 14 women) engaged in two running sessions, one with shoes and one without, both lasting 3 min at a consistent speed of 12 km/h. We captured running kinematic data using a photoelectric cell system throughout the sessions. Before the trials, we measured the thickness and cross-sectional area of both the Achilles tendon and plantar fascia using ultrasound.

Results and Conclusions

The Pearson test revealed a significant correlation ($p < 0,05$) between Achilles tendon and plantar fascia morphology and contact time ($r > -0.325$), flight time ($r > -0.325$) and duty factor ($r > -0.328$) during barefoot running. During the shod condition, no significant correlation was found between connective tissue morphology and kinematic variables. Conclusions: In barefoot running, greater size of the Achilles tendon and plantar fascia results in a reduced duty factor, attributed to longer flight times and shorter contact times.

Keywords: Barefoot, Kinematic, Running, Tendons,

Assessment of inspiratory muscle training in patients with multiple sclerosis. A systematic review

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Introduction

Multiple sclerosis (EM) is an autoimmune, degenerative disease characterized by demyelinating lesions in the central nervous system. EM can affect the respiratory musculature, leading to secretion buildup, respiratory failure, and ultimately death. Inspiratory muscle training (IMT), particularly using Threshold devices, has been proposed as a means to alleviate respiratory symptoms in EM. The aim of this study was to analyzed the available evidence on the effectiveness of IMT with Threshold in patients with EM.

Methods

Following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) recommendations, studies indexed in PubMed, PEDro, Cochrane and Scopus databases were systematically reviewed. Randomized controlled trials and pre-post studies were selected if they included patients with EM and their intervention group performed IMT using Threshold alone or in combination with physical exercise. The PEDro scale and the Cochrane Risk of Bias Tool were used to assess methodological quality and risk of bias, respectively.

Results and Conclusions

Two randomised clinical trials and four pre-post studies including 257 patients were selected. Most of the studies reported beneficial effects of IMT, and no serious adverse events were reported. Statistically significant improvements ($p<0.05$) in maximal respiratory pressures, ergoespirometric parameters, dyspnoea, balance, and aerobic capacity have been reported after IMT alone or in combination with physical exercise. However, improvements compared to control group were only observed for maximal inspiratory pressure. In contrast, no beneficial effects of IMT on fatigue, lower limb strength and quality of life were found. In conclusion, IMT using Threshold increases maximal respiratory pressures and ergoespirometric parameters in EM patients. In addition, its combination with physical exercise improves the sensation of dyspnoea, balance and aerobic capacity, although no benefits on fatigue, strength and quality of life have been observed.

Keywords: Multiple sclerosis, Inspiratory muscle training, Threshold, Maximal inspiratory Pressure

Respiratory muscle training in patients with chronic obstructive pulmonary disease: A systematic review

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Introduction

Chronic obstructive pulmonary disease (COPD) is characterised by persistent airflow obstruction resulting from chronic inflammation. It is the third cause of death in the world. COPD patients present persistent cough, increased secretions, dyspnoea and respiratory muscle weakness leading to decreased quality of life. It has been proposed that inspiratory muscle training (IMT) could improve the symptomatology and quality of life of COPD patients. The aim of the study was to analyze the available evidence on the efficacy of IMT in COPD patients.

Methods

Following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) recommendations, studies indexed in PubMed, PEDro and Cochrane databases were systematically reviewed. Randomized clinical trials published in the last 10 years, which included COPD patients and the intervention group performed IMT, were selected. The PEDro scale and the Cochrane Tool were used to analyze de methodological quality and risk of bias respectively.

Results and Conclusions

Seven randomized clinical trials that performed IMT with PowerBreath, Threshold and Pro2 Fit devices were included. Statistically significant ($p<0.05$) improvements in maximal inspiratory pressure (MIP), dyspnoea, aerobic capacity, balance, and quality of life have been reported at the end of IMT. However, significant ($p<0.05$) increases over the control group were only observed in MIP and balance. No differences between devices and no adverse effects were reported. In conclusion, IMT improves MIP, dyspnoea, aerobic capacity, balance, and quality of life in COPD patients, independently of the device used.

Keywords: Chronic obstructive pulmonary disease, Inspiratory muscle training, maximal inspiratory pressure, dyspnoea.

EFFECTS OF RESISTANCE TRAINING ON STRENGTH MANIFESTATIONS IN UNIVERSITY MEN

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Introduction

Muscular strength (MS) is a physical capacity that manifests in three distinct forms: dynamic strength, isometric strength, and explosive strength. Although each presents unique characteristics, MS is closely associated with both human body functionality and athletic performance. Therefore, understanding how this physical capacity can be developed is of considerable importance. In this regard, strength gains can be achieved through resistance training (RT), which promotes both neuromuscular adaptations (changes occurring in the communication between the nervous and muscular systems) and hypertrophic adaptations. Notably, neuromuscular adaptations predominate during the initial weeks of training. The objective of this study was to evaluate and compare the effects of two resistance training protocols (traditional resistance training [TRT] and resistance training with variable intensity [RTVI]) on strength manifestations in university men.

Methods

Twelve physically active men (22.1 ± 2.7 years; 175.8 ± 4.8 cm; 67.4 ± 8.8 kg), who had not engaged in resistance training (RT) in the previous 3 months, were included in this study. The assessments were conducted using the elbow flexion exercise and evaluated the following variables: maximal voluntary isometric contraction (MVIC), one-repetition maximum (1RM), and power output at 60% of 1RM, both before and after four weeks of traditional resistance training (TRT; n = 6) or resistance training with variable intensity (RTVI; n = 6). Data were analyzed using two-way ANOVA.

Results and Conclusions

There was an increase in strength manifestations, specifically in dynamic strength ($p < 0.001$), peak power ($p = 0.032$), and mean power ($p = 0.032$), with no significant differences between the groups. The findings suggest that both TRT and RTVI had a positive influence on muscular strength levels, supporting the existing literature indicating that resistance training is an effective method for developing muscular strength.

Keywords: Resistance Training, Physical Exercise, Muscular Strength.

Training on outdoor fitness equipment. Protocol and progression for adults and seniors.

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Introduction

The median age of the population is increasing. It is estimated that by 2040, 19.2% of the world's population will be over 60 years of age. This population group is associated with multiple age-related diseases such as cardiovascular diseases, respiratory diseases, osteoporosis, diabetes, cancer, cognitive impairment and dementia. This is why many public entities have opted for different methods of promoting an active lifestyle among the elderly, one of the many options being the installation of outdoor fitness equipment. These facilities consist of metal structures similar to traditional fitness machines, but which show some adaptations in order to be placed outdoors. They are commonly found in parks and public spaces, with free access, and with simple mechanics that facilitate their use. Although they are specially designed for the elderly, they are free to use, so anyone can access them. They work by means of a set of levers which is weighted with the user's own body weight. In spite of their great popularity, numerous researches defend their ineffectiveness, on the contrary, there are aspects which are not very detailed and which have not been taken into account when designing the different interventions. For this reason, the aim of the present work is the presentation of a training protocol, which also allows an increase in the training load on outdoor fitness equipment.

Methods

For this purpose, an 8-week circuit strength training plan was drawn up using only bio-healthy equipment. The training consisted of 11 exercises. These were performed on 8 different models of bio-healthy machines (Rider, Walk, Surf, Row, Parallel Bars, Gemini, Flywheel and Swing) of the company Entorno Urbano S.L.U (Murcia, Spain), located in a private area of the Universidad Católica San Antonio de Murcia, Murcia, Spain. Regarding the training, all subjects must be previously familiarised with the execution technique of each of the machines. During the sessions, the speed of execution will be controlled by means of a digital metronome.

Results and Conclusions

The result of the present work shows an 8-week planning of circuit training using bio-healthy equipment. With regard to the series, 1 series will be performed during the sessions of the first week, 2 series in the second week and 3 series in the remaining sessions up to the eighth week. The working time per exercise will be 30 seconds for the first 4 weeks and 45 seconds for the last 4 weeks. The number of repetitions per set will be 15, except for the last two weeks when it will be 11. In the concentric-eccentric execution phase controlled by metronome, the first four weeks will be at a 1/1 rhythm, weeks 5 and 6 will be at a 1/2 rhythm and the last two weeks will be at a 2/2 rhythm. Finally, the rest times will be 30 seconds between exercises except for the first week when it will be 45 seconds, and 4 minutes between sets except for week two when it will be 2 minutes. This proposal has already been used previously, obtaining positive results, so this protocol can be a great working tool to improve the health of the elderly population.

Keywords: Aging, guided exercise equipment, outdoor gym, strength, training.

Evolution of the cycling Power Profile and External Training Load in International Junior and U23 Triathletes: a between-seasons Longitudinal Analysis.

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Introduction

The power profile has been established as a reliable tool for monitoring performance in the cycling segment of triathlon. However, how training load influences the power profile remains unclear. The aim of this study was to analyse the evolution of mean maximal power (MMP) in international triathletes and to examine its relationship with external load-based training characteristics.

Methods

Cycling training and competition data from 7 male and 7 female junior and U23 triathletes were analysed longitudinally for 3 consecutive seasons. The MMP from the power profile was recorded, along with the training volume accumulated in each 2.0 W·kg-1 power band. A correlational analysis was conducted between MMP values and the training volume accumulated in each power band.

Results and Conclusions

All MMP values, except values of 10 s, 30 s and 5 min, increased ($p<0.05$) over the three seasons ($\Delta = 0.9\%$ to 4.8%), as well as the total time ($\Delta = 22.1\%$) and total distance ($\Delta =$ 32.8%). Specifically, the percentage time in the 4-6 W·kg-1 power band ($\Delta = 1.2\%$) and the MMP- 1 to 20 min performance ($\Delta = 3.3\%$ to 10.0%) increased ($p<0.05$) from 2 to 3 Season. MMP values of duration $\leq$ 30 s showed a very large correlation with the percentage of time spent in power bands of 12-14 W·kg-1. All MMP values showed a negative correlation with the percentage of time spent in the 0-2 W·kg-1 power band. Improvements in almost all power profile values over consecutive seasons were related to the increase in total training volume and time spent in moderate intensity power bands.

Keywords: power profile, cycling, performance, monitoring.

Enhancing Aerobic Capacity in Young Soccer Players: Impact of Combined Intermittent, Interval, and Small-Sided Games Training in a Periodized 3:1 Micro-Cycle

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Introduction

Soccer is a high-intensity, team-based invasion sport characterized by sporadic, multidirectional, and unpredictable movements 12. Optimizing training strategies to meet these demands is critical for enhancing player performance 1,11. A key component of effective training design is the management of training load 6 which is divided into external load (physical work performed) and internal load (physiological response). Regardless of internal characteristics, the work completed during training or competition is called the external load 7. The aerobic energy system plays a fundamental role in soccer performance, as players require high endurance to sustain repeated high-intensity efforts throughout a match. One of the most common methods used to improve aerobic capacity, particularly maximum oxygen uptake (VO2max), is interval training 4. Interval training is one of the most common methods that has been used to increase soccer players' VO2max. Changing the running speed is the main point of this method, which can be performed in various models 18. In recent years, intermittent training has gained attention for its ecological validity and close simulation of match conditions. This type of aerobic training may not impact as much as interval training, but it creates a situation just like the real match for the players. This means that players do not need to run continuously at a constant or changing speed; they must run and then walk or completely stop. So intermittent training is divided into run and rest 16. Additionally, small-sided games (SSGs) have become a popular training tool due to their technical, tactical, and physiological benefits 8. Each of these training models are required in training program of soccer players and the deliberate planning and organization of a training program that requires a logical and systematic sequencing of various training variables (e.g., intensity, volume, frequency, recovery period, and exercises) in an integrative manner to optimize performance outcomes at predetermined time points is known as periodization. Periodization should prioritize developing athletes and preventing injuries in addition to performance 9. This process presents the chance for a systematic, structured approach to all training in terms of many essential structural units, specifically the training sessions that serve as the core unit and the micro-cycles, meso-cycles, and macro-cycles 3. Within

this framework, the micro-cycle, typically encompassing a week of training, is the foundational unit that can be adapted based on match schedules, player health, fatigue, and environmental conditions. So, based on the mentioned parameters, this study aims to: (i) Investigate the effects of combining interval training, intermittent training, and SSG within a structured micro-cycle on the aerobic capacity of young soccer players. (ii) Compare the improvements in VO2max between central and lateral players in each age group separately. (iii) Assess the aerobic capacity progression of young soccer players subjected to the same training micro-cycle across two different age groups (U16 and U19). Accordingly, we hypothesize that (1) the integrated training model will significantly enhance VO2max in young soccer players, (2) lateral players will experience greater improvements in VO2max compared to central players, and (3) U19 players will show greater VO2max improvements than U16 players due to age-related physiological adaptations and training responses.

Methods

Thirty semi-professional male soccer players participated in the study, comprising two age groups: U16 (n = 13, mean age = 15.8 ± 0.4 years) and U19 (n = 17, mean age = 18.2 ± 0.3 years), enabling comparative analysis across maturational stages (Figure 1). Rigorous inclusion criteria, including active participation in semi-professional soccer training and competitions and the absence of significant recent injuries, ensured a homogenous baseline. Exclusion criteria included: (i) inability to complete three consecutive training sessions and (ii) injuries occurring during the study period that prevented full participation. During the 16-week intervention, two players dropped out due to injuries, and one player left for personal reasons. Data from these participants were excluded from the final analysis. All participants (or their legal guardians, for minors) provided written informed consent after being fully informed of the study's procedures, benefits, and potential risks. The protocol received ethical approval from the University of Tor Vergata Ethics Committee (approval code: 11/2024) and adhered to the Helsinki Declaration guidelines for human research.

Results and Conclusions

A one-way ANOVA revealed a statistically significant difference in VO2max improvement between the U16 and U19 groups, $F(1, 28) = 5.47$, $p = 0.027$, $\eta^2 = 0.07$. The U19 group demonstrated significantly greater improvement ($M = 29.49$, $SD = 12.39$) compared to the U16 group ($M = 22.35$, $SD = 10.27$), indicating that age had a meaningful effect on training response. Regarding correlation analysis, central players in both groups exhibited weak relationships between pre- and post-test VO2max ($r = 0.21$ for U16, $r = 0.17$ for U19). In contrast, lateral players showed strong correlations ($r = 0.78$ for U16, $r = 0.94$ for U19). The overall correlation between pre- and post-VO2max was moderate in U16 ($r = 0.65$) but strong in U19 ($r = 0.73$), suggesting that lateral players exhibited more consistent improvements in both groups. The Group × Factor Interaction analysis showed no statistically significant interaction effects ($p = 0.192$ for U16, $p = 0.229$ for U19), but a trend-level effect ($p = 0.065$) suggests that age and training adaptation might still influence improvement rates. Effect size comparisons further highlighted the impact

of age on training effectiveness. The U19 group exhibited a higher effect size ($\eta^2 = 0.83$) compared to U16 ($\eta^2 = 0.76$), reinforcing those older players responded more efficiently to training interventions. These matters show the group-specific effect sizes related to VO2max changes. The comparison chart insights confirm that U19 players had a higher pre-test VO2max and greater post-test improvements, while U16 players improved at a lower rate (Figure 7). Discussion According to the results of the current study, a significant improvement in VO2max was observed following the combined implementation of intermittent, interval, and small-sided game (SSG) training. This enhancement was more pronounced in the U19 group, whose members had passed through puberty, compared to the U16 group, which was still undergoing maturational development. Furthermore, players occupying lateral positions demonstrated greater aerobic improvements compared to those in central roles, suggesting positional demands may influence training responsiveness. The U19 group exhibited the strongest correlation between training and VO2max improvement, reinforcing the idea that older adolescent athletes may benefit more from aerobic conditioning due to advanced physiological maturity. These findings are consistent with Gaurav et al 5 who observed VO2max improvements in U19 soccer players following interval training interventions. . However, contrary results were reported by Nilsson and Cardinale 14 who found no significant difference in VO2max outcomes based on player positions. The U16 group also demonstrated meaningful improvements in VO2max, consistent with findings from Kabdwal et al. 8 who reported significant aerobic gains in U16 players following a combination of interval and explosive strength training. Similarly, Los Arcos et al. 10 showed that short intermittent training yielded superior VO2max enhancements compared to small-sided games or generic training in young players with an average age of 16.8 ± 3.1 years. The second aim of this study was to examine VO2max differences between central and lateral players. Results indicated that lateral players exhibited significantly greater improvements than central players in both age groups. These findings are supported by Barrera et al. 2, who observed similar trends among female soccer players, particularly noting greater aerobic gains in wide-position players compared to central defenders. The third hypothesis addressed age-related differences in VO2max development. As expected, the U19 group demonstrated significantly greater improvement compared to the U16 group. This aligns with Teplan et al. (Teplan et al., 2012.), who found that older adolescent players (U17) achieved higher VO2max scores than younger players (U16). These outcomes underscore the critical influence of maturation and pubertal p

Keywords: Micro-cycle, Small-Sided Games, VO2max, Aerobic Conditioning, Positional Differences

Exploring the Impact of Functional Exercise Rehabilitation on Neuroplastic Biomarker Changes in Cardiovascular Disorders

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Introduction

In the realm of healthcare, the intricate interplay between neuroplasticity, cardiovascular health, and functional exercise rehabilitation has garnered increasing attention. As researchers and clinicians delve deeper into understanding these connections, it becomes evident that a narrative approach can elucidate the multifaceted relationships between these domains. In this narrative review, we embark on a journey through the scientific landscape, exploring how different types of exercise interventions influence neuroplastic biomarker changes within the cardiovascular system. Several studies have been shown that learning new tasks triggers brain plasticity, leading to structural modifications and improved cognitive function, further underscoring the intricate relationship between neuroplasticity and cardiovascular health. Physical activity, including aerobic and resistance training, has emerged as a modifiable factor in promoting cardiovascular and brain health. Exercise interventions have been shown to enhance neuroplasticity and cognitive function, offering potential therapeutic benefits for individuals with cardiovascular disorders. Physical activity is able to induce BDNF expression and its synaptic performances, in repair and reorganize circuits through plasticity in homeostatic processes which is happen more in aging. The influence of physical activity on immunity functions of the body has been cornerstone in science of movement and it is observed that aerobic exercises lead to reduce the interlucin 6, interlucin 8, and tumor necrosis factor (TNF) in inflammation process. Aerobic exercise, in particular, has been associated with increased BDNF levels, which may contribute to improved brain structure and function. It was originally indicated that physical fitness and brain function are correlated when it was shown that older athletes had faster reaction times on a variety of cognitive tests than age matched inactive controls. It has been shown that qualitative changes (learning a new task) are necessary for the brain to modify its structure, triggering plastic changes shortly after training begins. Depending on the direction, acceleration, and force of movement into space for accessing or stepping, cortical neurons fire at various rates. These neurons can indicate various motions in response to changing stimuli and practice. Cortical and spinal levels of sensory feedback, such as proprioception, have a significant impact on motor skill via changing sensorimotor coordination. Moreover, balance and strength training have been shown to enhance cortical thickness and gray matter volume, highlighting the multifaceted benefits of exercise on neuroplasticity and cardiovascular

outcomes. Strength, power, running, and other functional capabilities are all enhanced by improvements in balance and proprioception, which are beneficial for stability as well. Increased instability exercises combined with coordination training should encourage motor control changes Furthermore, dancing has been considered and it has been shown a greater GMD than those who participate in repetition and strength training. Furthermore, the amount of BDNF in the dance group has begun to grow.

Methods

As a narrative review, the outcomes were gathered through PubMed, google scholar, research Gate and web of science. The keywords on searches were functional rehabilitation, exercise rehabilitation, neuroplasticity biomarker and cardiovascular disorders. All the selected studies were published in English and all of them were related to injury prevention process of patients. In some stage, arguments were considered separately and their interaction on each other were considered through combined studies which is shown clearly in Table 1. Table 1: different stage of studies consideration 1 Neuroplasticity biomarker VS Cardiovascular disease 2 Rehabilitation VS cardiovascular disease 3 Rehabilitation VS neuroplasticity biomarker

Results and Conclusions

In conclusion, this narrative journey has shed light on the intricate relationship between functional exercise rehabilitation, neuroplasticity, and cardiovascular health. The effect of functional exercises influences considered on neuroplasticity and gray matter which play a key role in function of autonomic nervous system to reach the impact on cardiovascular system through controlling hypertension. By adopting a holistic approach and leveraging diverse rehabilitation modalities, clinicians can optimize outcomes for patients with cardiovascular disorders. As we continue to unravel the complexities of this relationship, integrating evidence-based interventions into clinical practice holds the key to promoting health and well-being across the lifespan.

Keywords: neuroplasticity biomarkers- cardiovascular disorders- functional exercise rehabilitation

Effect of resistance training on resting metabolic rate in young and older adults. Pilot study.

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Introduction

Resting metabolic rate (RMR) refers to the amount of energy the body utilizes to maintain its vital functions while at rest and awake. It accounts for the largest portion of daily energy expenditure and is crucial in assessing metabolic status, which can aid in the prevention and treatment of various diseases. However, there is limited evidence analysing the effect of training on RMR. Therefore, the primary objective of this study was to investigate the impact of a velocity-based resistance training program on resting metabolic rate (RMR) using two different protocols (20 minutes vs. 30 minutes) across two age groups (young adults vs. older adults).

Methods

A randomized controlled experimental study was conducted with 12 participants divided into two age groups (6 older adults and 6 young adults), measuring RMR using indirect calorimetry before and after an 8-week of velocity-based resistance training (20% velocity loss), performing four sets of bench press and squat exercises with progressively increasing loads from 65% to 80% of 1RM. Dietary habits and body composition were also assessed before and after the training program.

Results and Conclusions

Resistance training increased the RMR (ANOVA, $P = 0.006$, $np^2 = 0.549$), with no training × age or training × protocol interaction effects observed ($P > 0.291$, $np^2 > 0.11$). The increase in RMR was similar in young adults (16,7%, 1888,16 +- 236,3 vs 2267,1 +- 509,9 kcal, P = 0,030) and older adults (13,8%, 1689,3 +- 279,6 vs 1961 +- 272,5 kcal, P = 0.036). An increase in caloric intake was also observed ($P < 0.001$, $np^2 = 0.72$) with no differences between age groups ($P = 0.553$, $np^2 = 0.03$), with a 21,1% increase in young adults (1691 +- 357 vs 2144 +- 575 kcal, P = 0.002) and a 17,2% increase in older adults (1707 +- 552 vs 2063 +- 656 kcal, P = 0.010). Body composition analysis revealed a 1–2% decrease in fat-free mass, which was only significant in the older adult group (P = 0.008). In conclusion, eight weeks of velocity-based resistance training resulted in an increase in resting metabolic rate (RMR) in both young and older adults. A compensatory rise in energy intake accompanied this increase in RMR but was independent of fat-free mass, suggesting greater metabolic activity in this tissue regardless of its volume.

Keywords: basal metabolism, energy metabolism, muscle strength, aged.

Impact of physical aquatic therapy rehabilitation in active patients after surgical anterior cruciate ligament reconstruction. A systematic review of controlled clinical trials.

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Introduction

Anterior cruciate ligament rupture is a growing injury in the sports world. For this reason, it has increased the need for rehabilitation that has driven the development and implementation of various therapies for rehabilitation. In this sense, the rehabilitation in aquatic environment, which by the intrinsic properties of water offers a different rehabilitation approach to traditional, using buoyancy, resistance and temperature to improve mobility, increase stability, reduce pain, promote recovery. The objective was to compare the efficacy of an aquatic rehabilitation exercise program regarding conventional rehabilitation using strength, stability, mobility, function and pain parameters in physically active adults after anterior cruciate ligament surgery.

Methods

Following the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) methodological guidelines, we reviewed original studies available in four databases (Medline (PubMed), Physiotherapy Evidence Datebase (PEDro), Cochrane Library and Semantic Scholar) that evaluated parameters of strength, stability, mobility, function and pain in patients after anterior cruciate ligament surgery. The PEDro scale and the critical review McMaster University Occupational Therapy Evidence-Based Practice Research Group were used to assess the methodological quality. Among the 71 studies identified in the search, only 9 articles met the inclusion criteria and were selected for the systematic review. The methodological quality of the selected studies was categorized as “good” or “very good”.

Results and Conclusions

Aquatic rehabilitation has been shown to generate significant benefits ($p < 0.05$) with respect to conventional therapy in terms of patients' subjective perception of their functional capacity, as assessed by the Lysom scale. In turn, significant improvements were obtained ($p < 0.05$) in knee flexor and extensor strength, the electrical activity of these movements and in proprioception. There were no significant differences ($p > 0.05$) in parameters related to knee pain and mobility. In conclusion, the use of aquatic therapy is more effective in the gain of functionality, strength and proprioception than conventional rehabilitation, probably due to the decrease of the gravitational effect that is propitiated in the aquatic environment by the intrinsic characteristics of water. Therefore, aquatic therapy would favor an early recovery aimed at recovering the patient's usual activity as soon as possible.

Keywords: Anterior cruciate ligament, Aquatic therapy, Physical activity, Strength, Mobility, Stability, Functionality.

Efficacy of a virtual reality rehabilitation program in post-stroke patients. A systematic review of controlled clinical trials.

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Introduction

Stroke is a pathology in which it is produced momentary detection of cerebral blood flow. The lack of oxygen and nutrients generates brain damage and different degrees of disability in the patient. Rehabilitation, focused on brain neuroplasticity, is essential to improve the quality of life of these patients. Virtual reality is a novel rehabilitation method in which a virtual simulation is generated with which the patient can interact. The objective was to compare the efficacy of virtual reality rehabilitation versus conventional rehabilitation in the functionality of the upper extremity in patients after having suffered a stroke.

Methods

Following the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) methodological guidelines, we reviewed the studies available in the Medline (PubMed), Physiotherapy Evidence Database (PEDro) and Scopus databases that evaluated the degree of functionality of the upper extremity after stroke. The methodological quality of the selected studies was assessed using the PEDro and McMaster scales, and the risk of bias by means of the Cochrane tool. Of the 208 studies related to virtual reality, only 8 of the trials met the inclusion criteria and were selected for systematic review. The methodological quality of the selected studies was categorized as "good", "very good" or 'excellent', and the risk of bias as "low".

Results and Conclusions

Rehabilitation through virtual reality has shown significant improvements ($p < 0.05$) in the range and speed of movement of the upper extremity. In turn, patient quality of life assessed by the Fugl-Meyer Assessment Upper Extremity also showed significant improvements ($p < 0.05$). In conclusion, rehabilitation using virtual reality is beneficial in improving upper extremity functionality and patient quality of life compared to conventional rehabilitation. These improvements could be due to the fact that these rehabilitation programs increase motivation and adherence to treatment, fundamental aspects to generate improvements in the patient.

Keywords: Stroke, Virtual reality, Rehabilitation, Upper extremity

What is the most effective ACL injury prevention strategy in football? An Umbrella Review.

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Introduction

The anterior cruciate ligament (ACL) is a fundamental part of the knee joint due to the role that it plays in stabilization and kinematics. ACL injuries are common in football to its nature of high-speed changes of direction which place stress on the knee joint. ACL injures require a lengthy rehabilitation period and can impact player performance even after successful surgery and return to play. ACL injury prevention is therefore a real focus in sport science. Which injury prevention programs are the most effective for preventing ACL injuries remains a debate and we decided to address this issue by means of an umbrella review of related factors to ACL injuries including prevention strategies.

Methods

A comprehensive search of Web of Science, PubMed, and Scopus was conducted covering systematic reviews and meta-analyses studies from March 1st, 2022 to March 1st, 2025. Using the PICOS framework, eligible studies included male and female amateur or professional football players aged 18–50. Interventions focused on ACL injury prevention strategies, including strength training, balance exercises, and mobility training. Comparators included standard care or no intervention. Outcomes assessed were ACL injury rates and related prevention metrics.

Results and Conclusions

Results: From an initial pool of 62 systematic reviews identified, 5 focused on injury prevention, comprising 41 individual studies. The FIFA 11+ was the most frequently studied injury prevention program, evaluated across 12 studies with over 8,500 participants. It consistently reduced ACL injury risk and improved neuromuscular control across various levels of football, including youth, amateur, and professional athletes. Reported reductions in ACL injuries ranged from 32% to 76% (IRR = 0.24–0.68), with the most substantial effects observed in studies with high compliance. While most studies demonstrated significant benefits, some variability was noted, potentially due to differences in implementation fidelity. Similar neuromuscular training programs, such as PEP and 11+ Kids, also showed marked injury reductions (up to 82%) in female and recreational players. Overall, structured and consistently applied neuromuscular interventions effectively lower ACL injury rates in football populations. Conclusion: Consistent implementation of neuromuscular training programs like FIFA 11+ significantly reduces ACL injury risk across diverse football populations, highlighting their effectiveness as a preventative strategy. These findings support the routine integration of structured injury prevention programs into team training, particularly at the youth and amateur levels where injury risk and lack of conditioning may be higher.

Coaches, medical staff, and sport scientists should prioritize program adherence and tailor exercises to individual player needs to maximize impact. Regular education and monitoring may further enhance compliance and ensure long-term effectiveness in reducing ACL injuries in football.

Keywords: ACL injury prevention, Neuromuscular training, FIFA 11+, Prehabilitation, Rehabilitation, Injury prevention programs, Strength training, Balance exercises, Mobility training, Compliance, Injury incidence reduction.

Effect of intermittent normobaric hypoxia on visuospatial working memory in healthy young adults

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Introduction

Normobaric intermittent hypoxia is an emerging technique that consists of controlled exposure to brief periods of low oxygen concentration under normal pressure conditions. Upon entering a hypoxic environment, the blood oxygen saturation (SpO2) of the human body decreases, and the regulation of the autonomic nervous system changes. The brain is particularly sensitive to the levels of oxygen available, so small variations can affect cognitive performance, especially in complex functions such as working memory. The aim of the study was to assess whether a session of intermittent normobaric hypoxia affects visuospatial working memory in healthy young adults.

Methods

Twenty-seven healthy young adults (mean age = 24.2 ± 4.8 years), randomly distributed in two groups, participated. The experimental group (GE; n = 13), was exposed to a session of intermittent normobaric hypoxia (12% O_2, equivalent to 4400 m) and the control group (GC; n = 14), remained in normoxic conditions. The Odd One Out test of the Cambridge Brain Sciences platform was used to assess visuospatial working memory. Performance was assessed in both groups before and after the intervention.

Results and Conclusions

The CG showed an improvement in the score obtained in the Odd One Out test ($p=0.034$; 95% CI=3.69,-0.17; $\eta^2=0.301$) in the post-test. No differences were found in the pre-post between the GE and the GC for any of the executive variables analyzed ($p>0.05$), nor effect of the covariate sex ($p>0.05$). However, significant differences were found in the variables SaO_2 ($p=0.001$; 95% CI=2.89,10.18) and HR ($p=0.012$; 95% CI=-15.55,-1.37) after hypoxia in the GE. Therefore, a single session of intermittent normobaric hypoxia does not compromise this executive function in healthy young people. It is recommended to investigate the effects of repeated exposures or in more sensitive populations, such as older adults or cognitively impaired patients.

Keywords: Working memory, normobaric intermittent hypoxia, cognition, executive functions.

Effect of an intermittent normobaric hypoxia session on sustained attention in healthy young adults.

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Introduction

Sustained attention is a fundamental component of executive functions that allows us to persevere in a behavioral response during a continuous or repetitive task and to maintain focus on tasks for prolonged periods of time. Its efficiency can be modulated by physiological factors such as cerebral oxygenation. Normobaric intermittent hypoxia has emerged as a promising noninvasive strategy with potential cognitive benefits, especially in domains such as attention. The aim of this research was to analyze the acute effect of a normobaric intermittent hypoxia session on sustained attention in healthy young adults.

Methods

Twenty-seven participants (mean age = 24.2 ± 4.8 years) were randomly assigned to an experimental group (EG; n = 13), which performed a session of intermittent hypoxia (12% O_2, equivalent to 4400 m), or to a control group (CG; n = 14), which remained in normoxic conditions. Sustained attention was assessed using the Double Trouble test (Cambridge Brain Sciences) before and after the intervention. This test assesses sustained attention and inhibitory control to semantic distractor stimuli, similar to the Stroop effect.

Results and Conclusions

The results of the study showed significant improvements in attentional performance in both groups after the intervention. In the CG, performance improved robustly ($p=0.001$; 95%CI=-19.11,-7.61; $\eta^2=0.660$). While in the GE, there was also a significant improvement ($p=0.002$; 95%CI=-15.31,-4.23; $\eta^2=0.552$). However, no significant differences were observed in the pre-post evolution between groups ($p > 0.05$), nor modulating effects of sex. These results suggest that a single session of normobaric intermittent hypoxia does not compromise sustained attention and may even facilitate its improvement under controlled conditions.

Keywords: sustained attention, intermittent hypoxia, cognition, gamification.

The influence of training on the use of the Extendable Police Baton in military police interventions

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Introduction

The effectiveness of police interventions is influenced by the training of personnel in the use of the extendable baton. This study investigates the impact of specific training on the physiological response and decision-making during tactical interventions where the use of force is necessary. The scientific literature available on the subject of this research is very limited.

Methods

- Study Design: Experimental study with a study group and a control group. - Sample: 30 participants from police and military forces. - Instruments: Practical intervention template, stimulus protocol, and assessment questionnaires. Variables such as blood oxygen saturation, heart rate, blood glucose and lactate, body temperature, upper and lower body muscle strength, cortical arousal, anxiety, and memory and attention will be analyzed using a questionnaire before and after a simulated tactical intervention. Central nervous system fatigue and cognitive function will also be measured using Flicker Fusion (UFF). - Procedure: Participants will perform simulated interventions involving the use of force before and after training. This will be followed by a pre- and post-intervention stress test to measure the operatives' physiological response before and after a simulated intervention.

Results and Conclusions

- Analyze the effects of training time on the physiological response of police and military personnel. - Quantify the relationship between training and decision-making in intervention situations. - Investigate the feasibility of implementing a training program to improve performance in interventions that require the use of force. - This project aims to scientifically demonstrate how training time influences the use of learned skills in complex situations.

Keywords: Training, Extendable Police Baton, Police or Military Intervention, Use of Force.

Quality of Life and Chronic Kidney Disease: What are the changes in different strength training loads? (preliminary study)

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Introduction

Chronic kidney disease directly affects people's perception of their quality of life and can lead to significant cognitive changes due to the restrictions imposed by treatment. Little is known about the use of the Blood Flow Restriction (BFR) training method on perceptual variables in individuals. The aim of this study was to evaluate the effects of 12 weeks of strength training using the blood flow restriction method on the perceived quality of life of patients with stage 3 chronic kidney disease (CKD).

Methods

Randomized clinical trial with 40 participants from a High Complexity Hospital in the city of Maceió/Alagoas, divided into 4 groups (control, low load, high load, RFS), evaluated by the Short-Form 36 (SF-36) questionnaire. Training was carried out 3 times a week, lasting 30-45 minutes, with different intensity protocols. The results were analyzed for normality (Shapiro-Wilk), intra-group comparison (Paired T/Wilcoxon), comparison between groups (ANOVA/Krushal-Wallis) and effect size (Cohen's d)

Results and Conclusions

The participants were 58 ± 8.9 years old, 62% non-diabetic, 87.5% hypertensive and 60% with low levels of physical activity. In relation to the internal comparison after the intervention, the RFS showed an improvement in the indices in all the QoL variables, but with significance in the dimensions limitation by physical aspects (p=0.042), social aspects (p=0.049) and mental health (p=0.007). The high load group only showed significance in the mental health variable (p=0.048), while in the control group there were changes in functional capacity (p=0.49), emotional aspects (p=0.016) and mental health (p=0.036). Low-load training showed significant changes in physical limitations (p=0.025), pain (p=0.057) and general health status (p=0.007). When comparing the groups, only the functional capacity variable showed a statistical difference between the RFS group and the low load group (p=0.0251), with a medium effect size (d=-0.796). Conclusion: RFS training is feasible and benefits the perception of quality of life in patients with CKD-3, standing out as a non-pharmacological strategy.

Keywords: Quality of Life; kidney failure; strength training; vascular occlusion

Velocity loss as a set-termination criterion in bench press: does previous fatigue affect it?

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Introduction

In recent years, the practicability of a velocity-based training approach to controlling volume during resistance training sets has been demonstrated (Gonzalez-Badillo et al., 2017; Sánchez-Medina & González-Badillo, 2011). Velocity loss (VL) magnitude has been proposed as a criterion for determining when each set should be stopped during resistance training in the bench press exercise (2). This approach is supported by the strong association observed between VL and both mechanical and metabolic fatigue (Sánchez-Medina & González-Badillo, 2011). Additionally, there is a close relationship between VL and the percentage of completed repetitions (%Rep) relative to the maximum number of repetitions (Gonzalez-Badillo et al., 2017; Rodriguez-Rosell et al., 2019). However, the relationship between the percentage of VL (%VL) and %Rep has only been analyzed in isolated sets. Therefore, this study aimed to analyze the relationship between %Rep and the percentage of %VL after different prior efforts (PE) in the bench press exercise.

Methods

Twelve men (age: 21.5 ± 1.7 years, body mass: 78.3 ± 10.4 kg, height: 1.79 ± 0.05 m, relative strength [one-repetition maximum {1RM} divided by body mass]: 1.03 kg·kg-1) performed three protocols (one week apart), each consisting of a set to failure with 60% 1RM, preceded by three sets with the same load but different %VL magnitudes (0% VL: PE0, 20% VL: PE20, 60% VL: PE60). The protocols were conducted in a randomized order, with one week separating each trial. To analyze and compare the mechanical and metabolic fatigue induced by each PE, the individual load that elicited a velocity of approximately 60% 1RM at baseline (V60-load) in the bench press, along with blood lactate concentration ([Lact]) post-PE, were measured. A one-way repeated measures analysis of variance was conducted to analyze the differences between protocols in the PE set for [Lact]. In addition, this analysis was used to analyze the differences between %Rep-%VL carried out after each PE set. A 4 (protocol: PE0, PE20, PE40, PE60) x 2 (time: Pre vs. Post) repeated measures analysis of variance was conducted to analyze the differences for V60-load. Bonferroni post hoc tests were used when the interaction was significant. Significance was accepted at $P \leq 0.05$. The %Rep-%VL relationship was determined using the coefficient of determination (R^2) and the standard error of estimate (SEE).

Results and Conclusions

Significant pre-post PE differences were observed in V60-load across all protocols ($P \leq 0.05$). Regarding [Lact], PE60 showed higher [Lact] values than PE0 and PE20 ($P \leq 0.05$), and [Lac] in PE20 was significantly higher than in PE0 ($P \leq 0.05$). A strong %Rep-%VL relationship was observed after each PE ($R^2 = 0.93, 0.95, 0.92$; SEE = 7.14%, 6.26%, 7.09% for PE0, PE20, and PE60, respectively). However, significant differences ($P < 0.05$) were found in the %Rep achieved at every %VL from 10% to 25% between PE60 and the other PE conditions. In the bench press exercise, %VL can be used to prescribe and monitor training volume after performing three sets with different levels of effort. However, when the effort level during the session is very high (i.e., training close to muscular failure in each set), the %Rep during the first part of the set (i.e., the first half of the repetitions completed) appears to differ from when the effort level during the session is low to moderate.

Keywords: Velocity based training, volumen prescription, level of effort

Interactions Between Citrulline Malate Supplementation and High-Intensity Interval Training in Enhancing Athletic Performance: A Narrative Review

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Introduction

Regular physical activity is widely recognized for promoting physical and mental well-being and reducing the risk of chronic diseases, morbidity, and early mortality. Despite these benefits, around 1.4 billion people globally remain insufficiently active, often due to time constraints. High-intensity interval training (HIIT) has emerged as a time-efficient training approach that enhances both aerobic and anaerobic capacity through repeated bouts of intense effort followed by brief recovery. Its effectiveness makes it appealing to athletes and general populations alike. Alongside training strategies, nutritional interventions such as citrulline malate (CM) supplementation have gained attention for their performance-enhancing potential. CM, a compound consisting of L-citrulline and malate, is thought to boost nitric oxide production, increase blood flow, reduce fatigue, and support mitochondrial energy pathways. The combination of HIIT and CM may offer synergistic benefits, with HIIT inducing strong physiological stress and CM potentially enhancing recovery, buffering fatigue, and improving blood flow during and after intense effort. Understanding the interaction between these two strategies is increasingly important in sports science, particularly for maximizing performance while managing training demands. This narrative review explores the mechanisms and performance effects associated with CM supplementation and various HIIT modalities, particularly within the context of sports performance.

Methods

A literature review was conducted using electronic databases (PubMed, Scopus, and Google Scholar), targeting research focused on CM supplementation, HIIT protocols, and athletic performance. Keywords included: amino acid, nitric oxide, ergogenic aid, physical fitness, VO_2max, and resistance training. Inclusion criteria were (1) investigation of the effects of CM supplementation on exercise performance, (2) examination of the effects of different modes of HIIT on exercise performance, (3) human participants, and (4) reporting of relevant outcomes such as aerobic capacity, anaerobic performance, or

other measures of exercise performance. Non-English and irrelevant studies were excluded.

Results and Conclusions

HIIT, characterized by repeated high-effort intervals with short rest periods, promotes significant improvements in aerobic and anaerobic performance. CM, a combination of L-citrulline and malate, is proposed to enhance nitric oxide synthesis, increase blood flow, reduce fatigue, and support energy metabolism via the aspartate-malate shuttle. While CM has shown promise in improving strength and endurance outcomes, findings across studies investigating the optimal dose, timing, mechanism of action, as well as reliable sources of purchase for CM consumption. remain limited and unclear. Many studies have involved untrained populations, and evidence in elite athletes is limited. Additionally, improper supplement use without professional oversight poses safety concerns, including the risk of contamination and inadvertent doping.

Keywords: Athletic Performance, Citrulline Malate, Ergogenic Aids, High-Intensity Interval Training (HIIT), Nitric Oxide, VO_2max

Effects of Different Plyometric Approaches on Speed and Agility in Football Players

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Introduction

Football is an intermittent cooperation-opposition sport. Explosive actions such as change of direction (COD) and sprinting are usually the most decisive in determining match outcomes. Plyometric training is considered one of the most effective training methods for improving these actions (Izquierdo et al., 2002). There are different types of plyometrics, such as horizontal and vertical, each with distinct effects and benefits (Moran et al., 2024). However, there is controversy over which of the two is more effective for sports performance.

Methods

A total of 23 amateur senior football players from the same team participated in the study, four of whom were excluded due to various reasons. They were randomly divided into two groups: HPJ (n = 10) and VPJ (n = 9). A 30-meter straight-line sprint time test and the Illinois agility test were performed at two time points: pre- and post-intervention. The intervention was conducted twice a week for 10 weeks and consisted of three jump exercises per group, depending on the direction of the jumps.

Results and Conclusions

The results showed significant differences between the pre- and post-tests in the sprint test for the HPJ group ($p < .001$; ES = 0.480). In the same test, no significant differences were found for the VPJ group ($p = .085$). In the Illinois test, no statistically significant differences were found in the interaction between pre- and post-intervention moments and the different types of intervention ($p = .473$). To conclude, jump training with a horizontal vector may be more effective than training with a vertical vector for improving sprint capacity in football players. However, neither plyometric orientation appears to have a significant effect on agility capacity.

Keywords: plyometrics, horizontal, vertical, sprint, agility.

Morphological and functional parameters during walking in children with unilateral Sever disease: intrasubject comparison

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Introduction

Calcaneal apophysitis (Sever's disease) is a common cause of heel pain in growing children and adolescents, in which the Achilles tendon exerts excessive traction on the still-immature growth plate of the calcaneus bone. It causes pain, particularly during walking and sports activities, thus becoming a limiting condition for children and negatively impacting their quality of life. The aim of this study was to compare morphological and functional parameters during walking between the affected and unaffected foot in subjects with unilateral Sever's disease.

Methods

A cross-sectional observational study was conducted in 13 children with unilateral Sever's disease. A morphological assessment was performed using ultrasound imaging (Vscan AirTM) of the Achilles tendon, plantar fascia, and gastrocnemius, including structural size and quality measurements. Subsequently, gait analysis was carried out at 4km·h-1 and 5 km·h-1 on a treadmill using inertial sensors (RunScribeTM) to assess spatiotemporal and kinetic parameters. Statistical data analysis was conducted using Phython (version 3.10.10) with the level of significance set at $p < 0.05$.

Results and Conclusions

Vertical impact and braking force showed statistically significant differences, both higher in the affected foot. Moreover, both variables presented a very large effect size, confirming the strength of the differences. However, no differences were found in any of the ultrasound variables. This study suggests that, in these children, symptoms may be more closely related to dynamic loading and ground reaction forces than to observable morphological differences. These findings contribute to a deeper understanding of the biomechanical behaviour or Sever's disease, with implication for improving its clinical management.

Keywords: Children, heel pain, calcaneal apophysitis, Sever disease, walking

Impact of Small-Sided Games with Distraction Models on Soccer Players' Performance and Behavior

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Introduction

Soccer, one of the most popular sports worldwide, has been the subject of extensive research to enhance player performance and team strategies. In recent years, small-sided games (SSGs) have gained significant attention as an effective training method that develops technical skills, tactical awareness, and physical fitness [1,2]. SSGs are modified versions of the full-sided game, typically involving fewer players and smaller pitch sizes, which allow for increased player involvement and a higher frequency of specific actions [3,4]. The effectiveness of SSGs in improving various aspects of soccer performance has been well-documented in the literature. Halouani et al. (2014) highlighted that SSGs can enhance players' physical conditioning, technical proficiency, and tactical understanding while maintaining a high level of motivation due to the game-like nature of the drills [5]. This sentiment is echoed by Aguiar et al. (2012), who emphasized the versatility of SSGs in addressing multiple training objectives [6]. The adaptability of SSGs allows coaches to manipulate parameters such as pitch size, player numbers, and rule modifications to target specific physiological and technical-tactical outcomes [7,8]. The physiological benefits of SSGs have been a particular focus of research. Hill-Haas et al. (2011) conducted a systematic review that demonstrated the effectiveness of SSGs in improving aerobic fitness, with some studies showing comparable or even superior results to traditional interval training methods [8]. Owen et al. (2004) explored how altering pitch sizes and player numbers in SSGs can influence players' physiological and technical demands, providing coaches with valuable insights for tailoring training sessions to specific objectives [9]. From a technical and tactical perspective, SSGs offer a unique environment for skill development. Sarmento et al. (2018) conducted a comprehensive systematic review highlighting SSGs' positive impact on players' decision-making abilities, passing accuracy, and overall game intelligence [7]. The constrained nature of SSGs forces players to make quicker decisions and execute skills under pressure, closely mimicking the demands of competitive matches [10]. While the benefits of SSGs are well-established, there is growing interest in understanding how external factors, mainly distractions, might influence player performance and behavior during these training scenarios. The concept of distraction in sports performance has been explored in various contexts, with studies demonstrating its potential to hinder and, in some cases, enhance athletic performance [11- 13]. In soccer specifically, the impact of distractions has been primarily studied in high-pressure situations such as penalty kicks. Furley et al. (2017) examined how goalkeeper-induced distractions affected penalty takers performance, highlighting the psychological interplay between the kicker and the goalkeeper [14]. This research underscores the potential for deliberate distractions to influence performance outcomes in critical game moments. The role of attention and

focus in soccer performance has been further emphasized by Tedesqui and Orlick (2015), who explored attentional focus patterns among elite soccer players across various playing positions and performance tasks [15]. Their findings suggest that different playing roles may require distinct attentional strategies, which could affect how players respond to distractions during SSGs. Recent studies have begun to explore the intersection of cognitive demands and physical performance in soccer. Ferreira et al. (2024) investigated the effects of prolonged cognitive effort and auditory distractors on professional soccer players' inhibitory control and mental fatigue levels [16]. Their findings suggest that cognitive challenges can significantly impact players' psychological and physical states, which could affect performance in training scenarios like SSGs. The potential for visu

Methods

A systematic and multi-pronged approach was adopted to ensure a comprehensive and rigorous literature search. The primary aim was to identify relevant studies that explored the impact of small-sided games with distraction models on soccer players' performance and behavior, encompassing a wide range of sources and publication outlets. The literature search commenced with an extensive exploration of electronic databases, including PubMed, SPORTDiscus, Web of Science, and Google Scholar. These databases were chosen for their comprehensive coverage of peer-reviewed literature in sports science, exercise physiology, and related disciplines. The search strategy involved carefully constructing search strings that combined relevant keywords and Boolean operators. The following search terms were used: ("small-sided games" OR "small-sided soccer" OR "conditioned games") AND (distraction* OR attention* OR cognitive load OR pressure OR stress) AND (soccer OR football) AND (performance OR behavior OR decision-making OR skill execution). The search was not limited by publication date or study design to capture a broad range of studies. This approach ensured that seminal works and foundational research on the topic were included in the review, regardless of their publication year. Additionally, no restrictions were placed on the age or skill level of the soccer players involved in the studies, as the review aimed to provide a comprehensive understanding of the impact of distractions across various developmental stages and competitive levels. Recognizing the potential for relevant studies to be published in sources beyond the initial database search, a complementary manual search was conducted. Reference lists of previously published reviews, meta-analyses, and primary research articles were carefully screened to identify additional studies that may have been overlooked in the electronic database searches. The search was extended to include conference proceedings, dissertations, and theses related to the topic to broaden the scope further. In addition to the literature search, experts in sports science, exercise psychology, and soccer performance were consulted to identify potential studies or ongoing research projects that may not have been captured through the initial searches. The comprehensive search method and broad scope adopted in this review aimed to capture various studies from various sources, publication outlets, and research disciplines.

Results and Conclusions

The comprehensive examination of SSGs with distractions and their influence on soccer players' behavior has revealed a complex interplay between cognitive processes, physical performance, and environmental factors. This research area has significant implications for player development, training methodologies, and match preparation strategies in soccer. The integration of distractions into SSGs has been shown to induce notable behavioral changes in players, affecting their decision-making processes, risk-taking behaviors, and overall tactical awareness. These changes reflect the players' adaptive responses to increased cognitive demands, highlighting the dynamic nature of soccer performance under varying conditions. The impact of distractions on cognitive load during SSGs has emerged as a critical factor in understanding player performance. While increased cognitive load can initially impair performance, it also presents opportunities for cognitive skill development and enhanced resilience to match-like pressures. The challenge lies in finding the optimal level of cognitive challenge that promotes growth without overwhelming players' mental resources. Attentional focus in the presence of distractions has been identified as a critical determinant of performance quality in SSGs. The ability to efficiently allocate attentional resources and filter relevant information from distractors appears to be a trainable skill that can significantly influence a player's effectiveness on the field. The research in this field has also underscored the importance of individualized training and distraction management approaches. Factors such as playing position, skill level, and personal cognitive traits contribute to how players respond to and manage distractions in SSGs, suggesting the need for tailored training strategies. As soccer continues to evolve, with increasing physical demands and more complex tactical systems, the ability to perform under various forms of distraction becomes ever more crucial. The insights gained from studying SSGs with distractions offer valuable tools for enhancing players' cognitive resilience and adaptability, potentially translating to improved performance in full-match scenarios. The field presents numerous exciting avenues for future research, from exploring novel types of distractions to investigating the long-term effects of distraction-rich training on player development. The integration of advanced technologies and interdisciplinary approaches promises to deepen our understanding of the cognitive aspects of soccer performance. In conclusion, studying SSGs with distractions represents a fertile ground for advancing our knowledge of soccer players' behavior and cognitive processes. By continuing to explore this area, researchers and practitioners can develop more sophisticated, evidence-based training methodologies that prepare players for the multifaceted challenges of modern soccer. As the game progresses, the insights gained from this research will play a crucial role in shaping the future of player development and performance enhancement in soccer.

Keywords: Cognitive load, attentional focus, training methodologies, performance metrics

Optimization of Cycling Performance through a New Telemetry System for the Study of Tire Inflation Pressure

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Introduction

In cycling, the analysis of the forces acting on the Cyclist-Bicycle System [CBS] is key to optimizing performance (1). Rolling Resistance Force [RRF] is one of these forces, influenced by various factors, including tire inflation pressure (2). This study describes the implementation of a low-cost telemetry system, aimed at real-time monitoring of variables during cycling practice, in order to evaluate the effect of inflation pressure on RRF under real-world conditions (3). The main objective is to describe the relationship between tire inflation pressure and RRF, to determine the optimal pressure, in order to optimize cyclist´s mechanical efficiency and, consequently, their performance.

Methods

A single cyclist performed 71 one-kilometer trials at the Zaragoza velodrome, all conducted under similar weather conditions. Six different tire inflation pressures [4, 5, 6, 7, 8, and 10 Bar] were tested using 25 mm Continental GatorSkin tires. The cyclist's bike was equipped with a validated pedal-power meter [Favero Electronics SRL, Arcade TV, Italy] (4), a magnetic speed sensor, a weather-air density station [Kestrel Meter 5500, NK Company, USA], and a digital scale to record CBS weight [72.38 Kg]. The newly developed telemetry system captured and synchronized sensor data in real time, instantly applying a linear regression model to each pressure value to calculate the RRF and the aerodynamic drag coefficient [CdA], based on the mathematical model described by Debraux et al. [2011] (5). After the trials, quadratic regression analysis was used to examine the relationship between tire pressure and RRF. Additionally, Student's t-tests were conducted to assess the statistical significance of differences between pressure conditions.

Results and Conclusions

The analysis revealed a quadratic relationship with a high goodness-of-fit [$R^2 = 0.9413$]. The lowest RRF values were observed at intermediate pressures of 6, 7, and 8 Bar, whereas both the lowest [4 and 5 Bar] and the highest [10 Bar] pressures resulted in significantly higher RRF values. The specific RRF values were as follows: 6.12 N at 4 Bar, 5.42 N at 5 Bar, 4.67 N at 6 Bar, 4.85 N at 7 Bar, 4.58 N at 8 Bar, and 5.26 N at 10 Bar. Based on the lowest RRF values and their similarity, 6, 7, and 8 Bar were identified as the optimal pressure range for minimizing RRF, while 4, 5, and 10 Bar were classified as non-optimal. Student's t-tests [$t[4] = 3.095$, $p = 0.036 < \alpha = 0.05$, Cohen's $d = 0.14$] showed statistically significant differences in RRF between the optimal and non-optimal

pressure groups. These differences translated into up to 9% more absolute power required by the cyclist to maintain the same speed: ±14 W when using optimal versus non-optimal pressures, at a power output of 150 W and a speed of 31.8 km/h. The CdA remained stable throughout the study [CV = 2.62%], indicating that the cyclist was able to maintain an almost identical aerodynamic position across all 71 trial runs. This consistency allows for a clear and isolated observation of the variation in RRF as a function of tire inflation pressure. This study highlights the significant influence of tire inflation pressure on rolling resistance, revealing a quadratic rather than linear relationship when tested on real-world surfaces with moderate roughness, such as the concrete surface of the Zaragoza Velodrome. This surface is considered more representative of typical secondary roads where cyclists commonly train, compared to the smooth parquet of Olympic velodromes. From a practical standpoint, the findings suggest that a tire pressure of 6 Bar is optimal for cyclists with similar characteristics to the subject in this study [CBS weight = 72.38 kg], when using 25 mm tires. 6 Bar pressure yielded almost the lowest RRF values, compared to the others optimal pressures [7 and 8 Bar], but 6 Bar is expected to provide better grip on the roads or concrete velodromes. The low-cost telemetry system used in this study proved to be a highly effective method for determining optimal tire pressure. By integrating real-time data from multiple bicycle sensors, it enables pressure optimization tailored to individual cyclists and specific surface characteristics, thereby reducing RRF and enhancing cycling efficiency and performance. Future research could replicate this methodology across varying surface roughness levels, different tire types, and cyclists with different body weights to further validate and generalize the applicability of these findings. Regarding grants and funding sources, the authors declare no conflicts of interest. However, they would like to acknowledge the companies “Bikone Bearings” and “Mecanizados PG” for providing some of the materials used in this study, as well as the Aragonese Cycling Federation for granting access to the facilities of the Zaragoza Municipal Velodrome.

Keywords: cycling, bike, "rollin resistance, aerodynamics", velodrome, telemetry, "tire pressure", biomechanics.

Dietary Supplement Use Among Amateur Bodybuilders in Türkiye: A Preliminary Report

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Introduction

Dietary supplements (DS) are of great interest among bodybuilders today due to their performance-enhancing and muscle development-supporting effects. However, unconscious use of these products can lead to adverse health consequences. Especially among amateur athletes, risk factors increase due to a lack of information, misdirection, and information from unreliable sources. This research aimed to examine the habits of sports supplement usage, frequency of use, preferred types of supplements, and motivation sources for these habits among amateur athletes in Türkiye.

Methods

This study evaluated the use of DS by amateur bodybuilders (n=36) who do sports in various sports centers in Istanbul, Türkiye. In this context, the athletes' sociodemographic data, physical training, DS usage pattern, and related parameters were questioned and recorded by face-to-face interviews. The obtained data were analyzed using the Jamovi (version 2.6.44) statistics program.

Results and Conclusions

The participants' average age was 22.8 ± 5.7 years, with an average height of 176.0 ± 7.5 cm and a body weight of 80.3 ± 15.4 kg. 86.1% of bodybuilders were male; 13.9% were female. Half of the participants reported being familiar with the regulations regarding DS use. The most frequently consumed supplements among participants were creatine monohydrate (44.4%), whey protein (33.3%), and caffeine (27.8%). These were followed by omega-3 (25.0%), magnesium (22.2%), glutamine (22.2%), sports drinks (19.4%), sports bars (19.4%), meat protein (19.4%), vitamin D (16.7%), vitamin C (16.7%), and carnitine (16.7%). Other reported supplements included zinc (13.9%), arginine (13.9%), ZMA (13.9%), pre-workout products (13.9%), carbohydrate powders (11.1%), iron (11.1%), beta-alanine (11.1%), citrulline (11.1%), and green tea (11.1%). The primary reasons for purchasing dietary supplements were to enhance sports performance (41.7%) and to improve physical appearance (36.1%). Most participants reported buying supplements online (52.8%) and at pharmacies (11.1%). This pilot study shows that DS use is common among amateur bodybuilders in Türkiye. The findings highlight the requirement for greater awareness and reliable sources of information about DS regulations to ensure safe use. The study is funded by the TUBITAK 2209A program.

Keywords: bodybuilding, dietary, sports, supplements

Exploring Nutritional Supplement Use by Turkish Handball Players: A Pilot Study

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Introduction

Handball is popular with high physical, physiological, and psychological demands. In addition to high-intensity movements, handball players must have performance components such as strength, agility, and speed and a suitable aerobic form to cope with high-intensity efforts. An optimal nutrition strategy helps maintain physical and cognitive performance, supports injury prevention, return to play, training adaptations, accelerates, and optimizes recovery processes. It has been stated in the literature that handball players tend to use nutritional supplements (NS) to facilitate the achievement of their nutritional goals. Therefore, studying how handball athletes use NS can offer an important understanding of the factors influencing their success. This study investigates supplement use among Turkish handball players and assessing the factors that shape their supplementation practices.

Methods

This cross-sectional study was completed with the participation of female (n=12) and male (n=44) licensed handball players (n=56) playing handball in different leagues of Turkish teams using convenience sampling. The data collection form addressed anthropometric values of participants, sports training properties, consumed NS types, and supplementation regarding factors. All data were analyzed using the Jamovi (version 2.6.44) statistics program.

Results and Conclusions

The participants' average age was 23.7 ± 8.5 years, with an average height of 184.0 ± 8.7 cm and a body weight of 84.1 ± 15.0 kg. 82.1% of the participants were professional handball players, and 39.2% competed in international competitions. The most preferred NS among handball players were magnesium (57.1%), vitamin C (32.1%), sports drinks (30.4%), whey protein (30.4%), vitamin D (28.6%), sports bars (28.6%), creatine (23.2%), omega-3 (23.2%), caffeine (17.9%), pre-workout supplements (16.1%), vitamin E (12.5%), carbohydrate powder (12.5%), iron (10.7%), vitamin complex (10.7%), essential amino acids (8.9%), and glutamin (8.9%). The main reasons for buying dietary NS were to improve sports performance (78.6%), to maintain health (57.1%), and to support physical appearance (26.8%). The most common places to purchase supplements were the internet (62.5%), sports market (30.4%), and trainers (28.6%) thanks to mainly

trainer recommendations (51.8%), self-motivation (41.1%) and dietitian suggestions (17.9%). These findings indicate that handball players primarily use NS to enhance performance and maintain health, highlighting the critical role of informed choices and professional guidance in shaping their supplementation practices.

Keywords: handball, nutrition, sports, supplements

Physical Activity and Intuitive Eating in Older Adults with Type 2 Diabetes: A Behavioral Health Perspective

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Introduction

As the global population continues to age, older adults face a higher burden of disease and multiple health conditions compared to younger people. Type 2 diabetes mellitus (T2DM) is among the most common chronic illnesses for this age group. With aging, reduced insulin sensitivity and less control over eating habits can lead to problems in blood sugar regulation and increase the risk of developing T2DM. Intuitive eating, which involves responding to internal cues of hunger and fullness rather than following external dietary rules, has emerged as a relevant concept in diabetes care. Likewise, physical activity remains a key factor in managing the disease. This study explores the physical activity and intuitive eating in individuals aged 65 and older with T2DM.

Methods

This study utilized a sociodemographic form, the Intuitive Eating Scale 2 (IES-2), the Mini-Mental State Examination (MMSE), and the International Physical Activity Questionnaire-Short Version (IPAQ-SV) for geriatric individuals diagnosed with type 2 diabetes mellitus (T2DM). Data analysis was conducted using the Jamovi statistics program.

Results and Conclusions

The study was completed with the participation of 165 geriatric individuals diagnosed with T2DM, 63.2% female and 36.8% male. Subjects' age, height, and weight were 69.8±4.5, 163±8.4 cm, and 77.4±13.8 kg, respectively. According to MMSE outcomes, 67.9% of the participants were healthy, and 32.1% showed mild mental symptoms. IPAQ-SV data showed that 65.9% of participants were inactive, 29.9% were minimally active, and 4.3% were adequately active. While the IES-2 total-score average of the participants was 3.22±0.3, 78.8% had a higher tendency towards intuitive eating behavior. The findings indicate that although most older adults with T2DM have low physical activity levels, they show a high tendency toward intuitive eating behavior. This suggests that, alongside promoting physical activity, eating behaviors should also be considered a key focus for supporting the health of older adults with diabetes. The study is funded by the TUBITAK 2209A program.

Keywords: aging, eating, diabetes, physical activity

Preventive strategies for bone mineral density loss in women: a systematic review

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Introduction

Osteoporosis is a systemic skeletal disorder characterized by a reduction in bone mineral density (BMD) and deterioration of the bone tissue microarchitecture (Pouresmaeili et al., 2018). This condition is further aggravated by immune cell dysregulation, which accelerates bone resorption and increases fracture risk, alongside the progressive decline in estrogen levels with aging (Fischer & Haffner-Luntzer, 2022). As highlighted by Akkawi and Zmerly (2018), the fragility resulting from these structural changes significantly elevates the likelihood of fractures. Among the various etiological factors, menopause is one of the primary contributors to osteoporosis onset, with postmenopausal Caucasian women being particularly susceptible (Sozen et al., 2017).

Methods

A systematic review was conducted using the PubMed, Web of Science, and Scopus databases, following the PRISMA guidelines (2020). Studies were included if they met the following criteria: (i) the sample consisted exclusively of women; (ii) participants had already experienced menopause; and (iii) subjects were referred to as 'postmenopausal women'. Studies were excluded if the full text was not available or if they were not original research articles. The methodological quality of the included studies was assessed using the PEDro scale. A total of 4 studies were included, comprising a total sample of 425 postmenopausal women.

Results and Conclusions

Results: Exercise interventions were associated with significant improvements in bone mineral density among postmenopausal women. The evidence also supports greater benefits when exercise is combined with adjunct therapies, such as calcium estrogen replacement, particularly in weight-bearing and resistance-based programs. Conclusion: The findings underscore the relevance of physical exercise in enhancing bone mineral density in postmenopausal women. Exercise-based interventions represent a key strategy for osteoporosis prevention; however, programs combining exercise with estrogen therapy tend to report greater effects. Reported outcomes include both beneficial effects and potential adverse events, providing a more nuanced understanding of the available preventive approaches in this population.

Keywords: Postmenopausal, physical exercise, osteoporosis.

Use of smart templates to analyze gait in single and dual task conditions in women with fibromyalgia

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Introduction

Women with fibromyalgia experience difficulty performing activities of daily living (ADLs) (Huijnen et al., 2015) due to the symptoms of this rheumatologic disorder, which include fatigue, stiffness, sleep disturbances, anxiety, depression, and impaired balance. These symptoms, along with cognitive impairments among others, may negatively affect performance and postural control (Bayazıt et al., 2002). ADLs typically require the simultaneous execution of both cognitive and motor tasks, known as dual task. In older adults and individuals with rheumatologic conditions, the ability to perform dual tasks is often reduced (Martín-Martínez et al., 2020), which increases the risk of falls and subsequently decreases independence and quality of life. Objective: analyze gait kinematic variables under single-task and dual-task conditions

Methods

Twelve healthy women (mean age = 50.83 ± 5.52) and twelve women with fibromyalgia (mean age = 53.25 ± 8.53) walked for 3 minutes on a treadmill under single-task (walking only) and dual-task (walking while performing the Stroop test) conditions. A 5-minute rest period was provided between trials, and the order of conditions was randomized. Participants wore smart insoles to collect gait kinematic data. The Mann–Whitney U test was used to compare performance between the fibromyalgia and control groups under both conditions. Additionally, the dual-task cost (DTC) was calculated to evaluate the effect of task interaction between groups using the Mann–Whitney U test. The Wilcoxon signed-rank test was employed to assess the effect of dual-tasking within each group

Results and Conclusions

Results: Significant between-group differences (fibromyalgia vs. healthy controls) were observed in gait speed and step length (both left and right legs) under both single-task and dual-task conditions. Regarding DTC, significant differences were found in left step width between groups. Within-group analysis revealed significant differences in double support time for both the fibromyalgia and healthy groups. Conclusion: Women with fibromyalgia exhibit slower and more cautious gait patterns under both single-task and dual-task conditions. An interaction effect of task type on DTC was observed in the

fibromyalgia group, specifically an increased left step width, suggesting a slight alteration in gait pattern that may reflect greater instability of the center of mass. Furthermore, double support time significantly increased under dual-task conditions compared to single-task in both groups.

Keywords: walking, pain, spatiotemporal, performance, Stroop test

The Hidden Impact of Pelvic Floor Dysfunction on Female Athletes' Participation, Performance, and Well-being – An Umbrella Review

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Introduction

Pelvic floor dysfunction (PFD)—including urinary incontinence (UI), pelvic organ prolapse (POP), and anal incontinence (AI)—is increasingly recognized among female athletes, yet its consequences on performance, participation, and well-being remain underappreciated. This umbrella review aimed to synthesize the prevalence, perceived impact, behavioral adaptations, psychological consequences, and performance implications of PFD in physically active and athletic women. A secondary objective was to explore athletes' knowledge, perceptions, and management of PFD symptoms.

Methods

A comprehensive search was conducted in PubMed, Scopus, Web of Science, and the Cochrane Library according to PRISMA guidelines. Eligible reviews included adult women with self-reported or diagnosed PFD (urinary incontinence, pelvic organ prolapse, or anal incontinence) in the context of exercise, sport, or physical activity. Studies reporting on female athletes or active women were included. Extracted outcomes included PFD, impact on participation and performance, behavioral modifications, psychological effects, and awareness or treatment uptake. Reviews focusing only on anatomical or surgical outcomes or non-athletic populations were excluded. Methodological quality was assessed using the AMSTAR2 tool.

Results and Conclusions

Seventeen systematic reviews were included, encompassing 33 unique primary studies with a combined sample of 22,662 female athletes, spanning both elite and recreational levels. Notably, 10 studies (30.3%) were cited in multiple reviews, reflecting a moderate overlap across the evidence base and highlighting recurring contributions within the literatura. Up to 72% of women modified or reduced activity, and 47% reported stopping exercise altogether due to symptoms. PFD also compromised performance; athletes avoided high-intensity tasks like vaults, jumps, and lifting, which led to altered biomechanics, reduced intensity, and training withdrawal. Psychosocial effects included shame, anxiety, and underreporting, with over 60% refraining from disclosure. Despite this, only 10–20% sought treatment, and knowledge of pelvic floor health and pelvic floor muscle training (PFMT) was limited. PFD substantially affects female athletes, limiting both participation and performance, yet it remains under-recognized and under-treated. Increasing awareness, systematic screening, and integrated pelvic health support are essential to safeguard athlete well-being and competitive longevity. Beyond general education, current evidence supports focused, sport-specific pelvic floor muscle training as a core intervention. In addition, pelvic floor readiness—developed through structured

reconditioning and individually tailored strength programs that respect load tolerance—seems crucial for safely integrating high-impact and resistance activities and enabling optimal return to play across all levels and life stages.

Keywords: Pelvic floor, female athletes, exercise behavior, sports performance

Nutrition and Taekwondo: Mapping Scientific Trends

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Introduction

Sports and exercise nutrition is a new branch of nutrition science that combines the principles of nutrition with physical activity to improve athletic performance and help prevent long-term disease. This science, studies the role of nutrients, supplements and nutritional strategies in improving physical performance, recovery and health of athletes. Taekwondo, as an Olympic combat sport with characteristics of speed, explosive power, and endurance, requires targeted nutritional support to achieve optimal performance. Taekwondo is mainly an anaerobic activity though it also relies notably on aerobic energy pathways.

Methods

This review, using Scopus searches, attempted to identify and analyze the prevailing trends and patterns in research related to nutrition and taekwondo. The focus was on articles published in the past 20 years (2005–2025), and selection criteria included direct relevance to taekwondo and nutritional interventions or topics. After an initial data review, 83 articles were selected and included in the final analysis.

Results and Conclusions

Based on the findings, for example, in the thematic map, 'muscle damage' can be mentioned as a motor theme, 'high-intensity training' as a niche theme, 'ergogenic aids' as an emerging or declining theme, and 'Taekwondo' as a basic theme. Also, the 9 most frequently repeated words in the authors' keywords section were taekwondo, martial arts, combat sports, athletes, performance, ergogenic aid, exercise, sports nutrition, weight loss. These words had 5 or more repetitions. Reviewing these scientific trends can help to better understand the areas of high application. Identifying research trends that are recurrent and important will help to better plan future studies and design more effective interventions. Also, this type of review can lead to the integration of scientific findings into practical programs for coaches and athletes at professional levels. The ultimate goal of this review is to provide an overview of the direction of research in this area and emphasize the need for more comprehensive and practical studies in the future.

Keywords: Sports Nutrition, Taekwondo, Dietary Supplements, Performance Enhancement, Research Trends

The Effects of Warm-up in Resistance-Training: A Systematic Review

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Introduction

The beneficial effects of warm-up on sports performance are well evidenced (McGowan et al., 2015). However, its relevance on resistance training is still ambiguous due to the scarcity of high-quality investigations on this topic (Gill et al., 2019). The aim of this study was to systematically analyze the effects different warm-up protocols on muscular performance during resistance training sessions.

Methods

The systematic review was conducted in accordance with the "Preferred Reporting Items for Systematic Reviews and Meta-Analysis" applied to Sports Sciences (PRISMA) (Rico-González et al., 2022). Search was performed on two databases (PubMed and Google Scholar). Eligible studies had to meet the next criteria: cross-sectional studies; healthy population with resistance training experience; active warm-up procedures; evaluate alterations on muscular performance in resistance training/strength exercises; include warm-up protocols with different variables and/or control group. Fourteen studies met the inclusion criteria.

Results and Conclusions

Both general and/or specific warm-up components produced beneficial effects on muscular performance and muscular force-generating capacity in resistance training sessions. However, using specific only components seems to be enough to potentiate the capacity previously mentioned. In contrast, stretching exercises should be avoided before a resistance training session due to the negative effect on force production capacities of the muscle in this context.

Keywords: Warm-up effects; Warm-up; Resistance-Training; Active warm-up.

Impact of Week Training Load, Match Load on Next Day Neuromuscular Fatigue on Professional Football Players

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Introduction

Elite football players face congested schedules that elevate the risk of neuromuscular fatigue, potentially impairing performance and increasing injury risk. Monitoring muscle-specific fatigue effectively is crucial, yet many traditional tests fail to detect subtle changes. Muscle-specific strength assessments like eccentric hamstring and hip adductor strength tests provide direct indicators of fatigue and injury risk. This study aims to determine how weekly training loads and acute match loads impact next-day neuromuscular function.

Methods

Participants: Twenty-four professional male football players from a single elite club (mean age: 26.5 ± 4.5 years; height: 181 ± 6 cm; body mass: 77.3 ± 7.8 kg) were monitored throughout 15 non-consecutive competitive weeks. Players represented diverse playing positions, excluding goalkeepers due to differing physical demands. All athletes were accustomed to regular neuromuscular performance assessments as part of their training routines. Study Design and Data Collection: A longitudinal observational design was employed. Players' weekly external load during training and match activities was monitored using Global Positioning System (GPS) units (Catapult Sports, 10 Hz) integrated with tri-axial accelerometers. GPS metrics included total distance covered, high-intensity distance (>20 km/h), sprint distance (>25 km/h), number of sprints, high-intensity actions, accelerations (>2 m·s−2), and decelerations (<–2 m·s−2). Data were processed using manufacturer software (Catapult OpenField), ensuring consistent measurement practices. Neuromuscular Fatigue Testing: Neuromuscular performance was assessed approximately 12–18 hours post- match via four specific tests: •Nordic Hamstring Exercise (NHE): Eccentric hamstring strength measured using a NordBord (Vald Performance, Australia), recording averagel bilateral force across three trials. •Iso Prone Hamstring Test: Isometric hamstring strength measured in a prone, extended-knee position (NordBord, Vald Performance), recording average bilateral force from two maximal 5-second trials. •Hip Adductor and Abductor Strength Tests: Using a ForceFrame (Vald Performance), athletes performed bilateral isometric squeezes (adduction/abduction) at 45° hip flexion. Mean bilateral force from two trials was recorded. Analysis: Initially, missing data (7–23% of observations) were imputed using Multiple Imputation by Chained Equations (MICE). PCA reduced dimensionality of correlated GPS load variables, creating composite training and match load indicators. Linear Mixed-Effects Models (LMMs) were then conducted using PCA-derived load

metrics (Training PC1, Match PC1, Match PC2) as fixed-effect predictors, with player identity as a random intercept. Models assessed load impacts on next-day neuromuscular strength outcomes, evaluating statistical significance using 95% confidence intervals and p-values ($p < 0.05$ considered significant).

Results and Conclusions

Higher match loads significantly reduced next-day eccentric hamstring strength measured via the Nordic Hamstring Exercise ($\beta = -5.12$ N per SD increase; $p = 0.046$), indicating acute hamstring fatigue. Weekly training load showed minimal immediate effect on neuromuscular outcomes (all $p > 0.3$), suggesting effective load management throughout the training week. Interestingly, matches characterized by a higher proportion of sprinting activities slightly increased next-day hip adductor strength ($\beta = +11.68$ N; $p = 0.046$), highlighting a nuanced muscular response warranting further investigation. This study highlights that match load significantly impacts next-day eccentric hamstring strength, emphasizing the importance of targeted recovery strategies following intense matches. In contrast, the accumulated weekly training load had minimal immediate neuromuscular effects, indicating effective workload management. The Nordic Hamstring Exercise emerges as a particularly sensitive indicator of match-induced fatigue. Coaches and practitioners should utilize such assessments regularly to optimize recovery protocols, enhance performance, and mitigate injury risk among elite football players.

Keywords: training load; match load; neuromuscular fatigue; hamstring strength; adductor; abductor; monitoring; football

Could isokinetic strength be modulated by the menstrual cycle in female athletes?

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Introduction

Fluctuations of hormones which are related to the muscle force production and metabolism as follicle-stimulating hormone (FSH) and luteinizing hormone (LH) along the different phased of the menstrual cycle phases (PMC) could impact in the neuromuscular performance in females. The knowledge of the impact of the menstrual cycle in the neuromuscular potential of female athletes is very important because it could determine the response and adaptation to the training stimulus. Considering isokinetic assessment as the gold standard for the measurement of neuromuscular performance, the aim of this systematic review was to analyse the impact of the different MPC on isokinetic strength in female athletes.

Methods

This systematic review has been performed attending to the guidelines of the PRISMA declaration. Therefore, in PubMed and Web of Science databases were including different keywords related to each one of the PICO outcomes (female athletes – comparative of different PMC -isokinetic strength) connected by Boolean connectors.

Results and Conclusions

After removing duplicates (n=2443) and discard 4591 for considering them irrelevant in relation to the topic, a total of 198 were identified as potential selective. However, after applying all the inclusion criteria only 9 studies analysed the impact of the PMC. The isokinetic velocities more commonly assessed was 60º/s (8 studies) followed of 180º/s (2 studies), however it has been analysed other velocities too (2 studies measured at 30º/s and other studies 90º/s, 240º/s and 300º/s). Additionally, 2 studies assessed muscular endurance procedures. The main findings of this systematic review are that along ovulatory phase could be increased isokinetic maximal strength at velocities above 60º/s in comparison with the other phases while along the early follicular phase could be a reduced performance in comparison with both, ovulatory and luteal phase. Related to muscular endurance, it has not been reported any impact of the PMC. Low and moderate velocities in isokinetic movement include a maximum recruitment that include type I and type II muscle fibres. Based on it, it is possible that the higher levels of FSH and LH

along the ovulation phase could enhance muscle contraction and low/moderate velocities could be more sensible than faster velocities (that implies a selective recruitment of type II muscle fibres) for detecting statistical effects of the impact of PMC on neuromuscular performance.

Keywords: Athlete; Exercise; Gender; Neuromuscular; Resistance training; Women

Study of the Goals Scored During the 2023 FIFA Women's World Cup

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Introduction

Introduction. Although Women's Soccer has become the new sports phenomenon (Soroka, 2017), research on technical, tactical, physical behavior and the influence of contextual variables remains scarce (Harkness-Armstrong et al., 2022). The frequency of goals scored is a widely studied variable in Men's Soccer (Çobanoğlu, 2019; Rance, 2023; Yolgörmez & Tütüncü, 2023). In Women's Soccer, Armatas et al. (2007) examined goal frequency from the second edition of the FIFA Women's World Cup (WWC) held in Sweden in 1995 through to the fourth edition in the United States in 2003. Recording the goals scored in a World Cup allows for the identification of time intervals during which the highest number of goals are scored information that can be used to gain a competitive advantage or to reduce the likelihood of conceding during specific periods. For this reason and considering that this type of analysis has not been conducted in more recent WWC editions, the aim of this study was to analyze the frequency of goals scored in the 2023 FIFA Women's World Cup.

Methods

Methodology. Goals scored during the 64 matches of the ninth edition of the 2023 FIFA Women's World Cup were analyzed. The data were obtained from FIFA's official website (FIFA, 2023b). The independent variable was the 15-minute time intervals, and the dependent variable was the number of goals scored. Following data collection, intra-observer reliability was assessed (> .932; Kappa coefficient = very good; ICC = high agreement) (Altman, 1991; Vincent, 1999). Inter-observer reliability was assumed given that the data were sourced from FIFA, which follows established procedures to ensure data accuracy (FIFA, 2023a). Descriptive statistics (frequencies and percentages) were also conducted using the Jamovi 2.4.7 software (R Core Team, 2022; The Jamovi Project, 2023).

Results and Conclusions

Results and Discussion. After analyzing the distribution of goals across 15-minute intervals, it was observed that the highest scoring period in the first half occurred between minutes 16–30 (28 goals, 17.07%), while in the second half, it was between minutes 61–75 (26 goals, 15.85%). Additionally, the only goal scored during extra time occurred between minutes 106–120 (0.61%). The findings of this study—particularly the critical period in the first half—do not align with those reported in the French and English Women's Leagues, nor with the 2022 FIFA Men's World Cup, where the critical scoring period was between minutes 30–45. However, the second-half critical period in the 2023

WWC does match the trend observed in the 2022 FIFA Men's World Cup. In contrast, it does not coincide with the peak period reported in European Women's Leagues, where the highest scoring interval was between minutes 45–60, surpassing the interval identified in this study by just one goal (Mesquita et al., 2023; Yolgörmez & Tütüncü, 2023). Conclusions. Although these findings revealed two critical 15-minute periods during matches of the 2023 FIFA Women's World Cup (16–30 min and 61–75 min), it can be concluded that the scoring dynamics tend to differ depending on the specific football competition. This variability is likely influenced by factors such as playing styles, types of competition, club philosophies, and technical, tactical, and physical components. Therefore, it is recommended to identify goal frequency based on each individual competition.

Keywords: Frequency, Goals, Women's World Cup

PREVALENCE OF URINARY INCONTINENCE IN FEMALE ATHLETES: A SYSTEMATIC REVIEW

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Introduction

Urinary incontinence (UI), defined as any involuntary loss of urine (Teixeira et al., 2018), is a common issue among women, with an estimated prevalence ranging from 10% to 55%, depending on various individual and contextual factors (Eliasson, Larsson, Mattsson, et al., 2002). This condition tends to occur more frequently in women who practice high-impact sports disciplines due to the increased intra-abdominal pressure generated during exercise (Bo, 2004). Despite its high incidence, UI remains an underestimated issue in the sports field, affecting both the health and performance of female athletes.

Methods

A systematic review was conducted using the PubMed, Web of Science, and Scopus databases, following the PRISMA® guidelines. Studies published since the year 2000 were included if they met the following criteria: (i) participation of female athletes between 18 and 60 years old; (ii) assessment through specific UI questionnaires or clinical tests of pelvic floor function; (iii) analysis of associated variables such as the type of sport. Studies involving pregnant women, research focused exclusively on other pelvic dysfunctions, articles not available in full text, and non-original publications such as theses, books, or conference abstracts were excluded. Methodological quality was assessed using the PEDro scale.

Results and Conclusions

After applying the selection criteria, 6 studies were included in the final review out of a total of 17 identified articles. All used observational questionnaires to assess the presence of UI symptoms. The results indicate a higher prevalence of UI in women participating in high-impact sports such as athletics, trampoline, or weightlifting, compared to lower-impact disciplines. Additionally, some studies suggest a possible relationship between training intensity and symptom severity, although further research is needed to confirm this association. UI is a common condition among female athletes, particularly those engaged in high-impact sports. Despite its high prevalence, UI remains a largely overlooked and unaddressed issue in the sports context. Early detection, education on pelvic floor health, and the development of preventive strategies are essential to preserve both the health and performance of female athletes

Keywords: Urinary dysfunction, Abdominal pressure, Perineal health

Analysis of gender differences in the perception and satisfaction with the use of Edpuzzle for strength-resistance training in adolescents in compulsory secondary education

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Introduction

The number of adolescents who meet the recommendations established by the World Health Organization in terms of strength-resistance training is very low. In addition, the time dedicated to this type of content in physical education classes is scarce. For this reason, interventions that promote strength-resistance training are being developed outside school hours, but the perception of the students who use them and whether this affects adherence to them is unknown. For this reason, the objective of the study was to know the opinion of adolescent men and women regarding the satisfaction and usefulness of a strength-resistance training program carried out after school hours through the Edpuzzle platform.

Methods

A 12-week randomized controlled trial was conducted consisting of an online strength-endurance intervention, delivered outside school hours, through the Edpuzzle platform. The sessions included exercises targeting the major muscle groups and their duration progressively increased from 35 to 60 minutes over the course of the program. In total, 52 adolescents participated (mean age: 16.09±0.98 years; 33 females and 19 males). At the end of the intervention, the participants completed a rating scale of the Edpuzzle platform, obtaining scores in the dimensions of "use" and "satisfaction".

Results and Conclusions

The average Edpuzzle "use" score was 2.91±1.63 for men and 3.57±0.92 for women, there being significant differences between the two (mean difference: -0.65; p=0.045). Similarly, the mean score for men in "satisfaction" was 2.95±1.58, while for women it was 3.65±0.98, there being significant differences between the two groups (mean difference: -0.69; p=0.037). As for the reasons for not completing the intervention, most of the women emphasized that they did not want to make use of the platform (82.0%), while the men, in addition to not wanting to (51.1%), were not attracted (20.0%) and were not sufficiently interested in the subject of physical education (13.3%). Therefore, it can be concluded that although women rated the Edpuzzle platform higher, it was not enough for them to complete the entire strength-resistance intervention, while men were not attracted to this type of intervention.

Keywords: Adolescents; Edpuzzle; Strength-endurance.

Impact of the use of Edpuzzle for strength-resistance training on psychological variables in adolescents in compulsory secondary education

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Introduction

Strength-endurance training not only leads to improvements in the physical health and body composition of adolescents, but has also been shown to have a positive impact on the psychological state of this population. However, few adolescents comply with the recommendations established by the World Health Organization for strength-resistance training, which leads to the loss of the potential benefits that this type of training has on overall health. For this reason, the aim of the study was to analyze the impact of an after-school strength-resistance intervention using the Edpuzzle platform on the psychological state of adolescents.

Methods

A 12-week randomized controlled trial was conducted. A total of 107 adolescents (mean age: 16.09±0.98 years; 62 females and 45 males), randomly distributed between an experimental group (EG; n=52) and a control group (CG; n=55) participated in the investigation. For twelve weeks, the GE participants performed an after-school online strength-resistance intervention through the Edpuzzle platform. The sessions included exercises targeting the main muscle groups and their duration progressively increased from 35 to 60 minutes throughout the program. Basic psychological needs and life satisfaction were analyzed before and after the intervention.

Results and Conclusions

No significant differences were found in competence (EG: p=0.876; CG: p=0.247), autonomy (EG: p=0.756; CG: p=0.320), social relationship (EG: p=0.886; CG: p=0.836), or life satisfaction (EG: p=0.689; CG: p=0.468) of any of the study groups. Therefore, it can be concluded that a strength-endurance intervention promoted from the subject of physical education and carried out in after-school hours through the Edpuzzle platform does not seem to have a significant impact on the psychological state of adolescents.

Keywords: Adolescents; Edpuzzle; Psychological state.

High-Intensity Interval Training (Tabata) and Its Impact on Muscular Strength in Dancers and Sedentary Individual

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Introduction

Numerous authors recognise the importance of good physical condition in dancers, stating that they must prepare themselves physiologically (Angiogi, Metsios, Twitchett, Koutedakis and Wyon, 2009; Irvine, Redding and Rafferty, 2011 and Rodrigues-Krause, Krause and Reischak-Oliveira, 2015). In this sense, it should be noted that dance is a type of physical activity whose main instrument of work is the body itself and that is why good physical conditioning is necessary. McCormack et al. (2019) grouped in order of importance the basic physical characteristics, highlighting strength as one of the most important in the physical condition of dancers. Elizondo (2022) concludes that it is necessary to implement training methods to improve strength in dancers as this quality is essential in any physical activity (Koutedakis et al., 2005; Suchomel et al., 2016). In the last decade, high intensity interval training (HIIT) has gained presence in the preparation of dancers, being the Tabata method one of the most studied (Tabata et al., 1996).

Methods

A pre-post experimental study was conducted to analyze the effects of a HIIT protocol (Tabata method) on the physical condition of dancers. A total of 21 participants were divided into two groups: an experimental group (dancers; n=11) and a control group (sedentary individuals; n=10). Both groups were assessed at baseline and after 10 weeks of training in various strength variables, including handgrip (dominant and non-dominant), countermovement jump (CMJ) height, and relative CMJ power.

Results and Conclusions

After the 10-week intervention, no statistically significant changes were observed in handgrip strength or CMJ height ($p > 0.05$). However, a significant time × group interaction effect was found for relative CMJ power ($F = 5.996$; $p = 0.026$; $\eta^2p = 0.273$), indicating an improvement in the dancer group. These findings suggest that HIIT training may be an effective strategy for enhancing specific aspects of physical performance in dancers, although further research is needed to confirm and expand upon these results.

Keywords: Fitness, strength, dancers, High Intensity Interval Training, Tabata method, sedentary people.

Multidimensional Rehabilitation Protocol to Improve Function in Athletes with Patellar Tendinopathy: A Randomized Controlled Trial

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Introduction

Patellar tendinopathy (PT) is a common overuse injury in athletes, leading to pain and impaired performance. Although conservative treatments like eccentric training and shockwave therapy are used, their combined effect remains underexplored. This study evaluates the effectiveness of a multidimensional rehabilitation program combining eccentric training, stretching, and extracorporeal shockwave therapy.

Methods

A randomized controlled trial was conducted with 29 athletes diagnosed with PT. Participants were assigned to an intervention group (eccentric training + stretching + shockwave therapy) or a control group (placebo therapy). Outcomes included pain (VISA-P), countermovement jump (CMJ), peak power output, and body composition. Assessments were taken at baseline, 4 weeks, and 8 weeks.

Results and Conclusions

The intervention group showed significant improvements in VISA-P scores and CMJ performance over time, with no changes in body composition. Power output increased significantly, although no changes were detected in the load–velocity relationship. These findings suggest that a multimodal rehabilitation approach effectively reduces pain and enhances functional performance in athletes with PT, without compromising training continuity.

Keywords: Patellar tendinopathy; eccentric training; shockwave therapy; neuromuscular rehabilitation; reconditioning

Mental and Behavioral Health Indicators in Retired Turkish Athletes: Preliminary Findings

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Introduction

Sports are essential for improving and developing health. Retirement from sports is an occupational transition associated with changes in many habits related to nutrition and lifestyle. Changes in physical activity and food preferences can cause many problems, such as a sedentary lifestyle, stress, depression, and anxiety. For this reason, the career termination process in elite athletes can disrupt the future professional and social functioning of these individuals. This study aims to determine the mental well-being, hedonic eating, and physical activity levels of Turkish retired athletes from various disciplines.

Methods

This cross-sectional study was completed with retired athletes (n=40) who played professional sports in different branches. The participants were questioned about their sociodemographic characteristics, data regarding their professional sports careers, and lifestyle factors. Additionally, the International Physical Activity Questionnaire-Short Version (IPAQ-SV), Beck Depression Inventory-Short Form (BDI-SF), and Three-Factor Eating Questionnaire (TFEQ-R18) were applied. Statistical analyses were performed in the Jamovi software.

Results and Conclusions

The female (10.0%) and male (90.0%) participants' mean age, weight, and height were 58.5 ± 15.0 years, 86.5 ± 16.8 kg, and 179.0 ± 5.8 cm, respectively. Nearly half of the participants possessed at least a Bachelor's degree. Although 30.0% had retired from sports, they continued to work. 63.2% of subjects reported never smoking, and 46.9% reported never consuming alcohol. Based on the IPAQ-SV, 34.5% of participants were inactive, 34.5% were minimally active, and 31.0% were adequately active. BDI-SF demonstrated that 25.0% of the participants had mild depression symptoms, and 7.5% had moderate depression symptoms. According to the participants' TFEQ-R18 results, cognitive restraint, uncontrolled eating, and emotional eating scores were 54.4 ± 16.9, 63.3 ± 16.3, and 64.7 ± 28.3, respectively. These findings highlight the need for future research focusing on the relationship between depressive symptom management and eating attitudes in this population.

Keywords: athlete, depression, eating, physical activity, lifestyle

Effects of Physical Exercise on Insulin in Prostate Cancer

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Introduction

Prostate cancer ranked as the second most prevalent and the most common cancer among males. Its incidence reached 1.5 million new cases worldwide (4). Regardless of the chosen treatment, prostate cancer survivors frequently face a high incidence of morbidity due to both the disease itself and its treatments, particularly androgen deprivation therapy (ADT). The adverse effects of ADT may have a significant impact on the patient's quality of life, urinary incontinence, sexual dysfunction, or chronic diarrhoea, among others. Additionally, men with prostate cancer could be psychologically affected, feeling more vulnerable due to the loss of masculine expressions.

Methods

The articles were included if they meet the following inclusion criteria: (a) participants had prostate cancer, (b) the intervention included any kind of exercise intervention, (c) the article reported effects on insulin, (d) the design included a control group, and (e) participants were randomly assigned to exercise and control groups. The following exclusion criteria were set: (a) the article was not written in English; (b) the article was a consensus, review, guideline, conference abstract, and/or a study protocol or design; (c) prostate cancer patients' results were not reported separately; (d) the article was an acute intervention; (e) the article had duplicate data from another included article; (f) the article was not available; (g) the article had an intervention for cancer prevention; and (h) the article had a healthy men control group. Meta-analysis statistics were conducted using Review Manager Software (RevMan) version (5.4).

Results and Conclusions

A total of six studies were included in the meta-analysis, with 148 participants in the experimental groups and 139 in the control groups. The studies were grouped into two categories of exercise interventions: resistance exercise and combined exercise. Within the resistance exercise subgroup, the SMD was -0.62 [95% CI: -2.69 to 1.44], with considerable heterogeneity (I^2 = 93%). The combined exercise subgroup showed a significant effect (p-value = 0.03) with a pooled SMD of -0.31 [95% CI: -0.59 to -0.03], with no observed heterogeneity (I^2 = 0%). The overall pooled effect size across all studies was -0.35 [95% CI: -1.00 to 0.31], with substantial heterogeneity across studies (I^2 = 85%). No significant subgroup differences were detected (χ^2 = 0.09, df = 1, P = 0.77; I^2

= 0%). No negative effects were reported in this review; therefore, physical exercise should be considered a key component of the non-pharmacological treatment for men with prostate cancer. Combined exercise has proven to be the most effective in the study. In fact, combining resistance training with aerobic exercise has been shown to effectively regulate glucose metabolism by enhancing insulin production and supporting improved gluconeogenesis. This is particularly relevant in cancer patients, who often present obesity as a primary comorbidity. Thus, it may serve as a preventive mechanism against this condition. In addition, given that ADT therapy is associated with the development of insulin resistance, the increase in insulin levels and the improvement in its function help to maintain glucose levels within normal physiological ranges. For this reason, the continued practice of physical exercise may serve as an external regulator of the body's normal metabolic processes, counteracting the dysregulation induced by cancer.

Keywords: systematic review and metanalysis, cancer patients, exercise oncology, cancer metabolism, randomized control trials

Monitoring Training Load: GPS-Based Analysis of Monotony and Strain in Professional Soccer Starters and Non-Starters Throughout a Full Season

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Introduction

soccer is a globally popular team sport characterized by high physical and physiological demands, necessitating the implementation of structured and well-monitored training regimens throughout the competitive season.This study aimed to: (i) quantify weekly averages of training monotony (TM) and training strain (TS) based on the frequency of accelerations (Acc) and decelerations (Dec) across a full season; and (ii) examine differences between starters and non-starters in weekly TM and TS during the pre-season and in-season phases.

Methods

Nineteen professional soccer players from a team competing in the Iranian Premier League (mean age: 28 ± 4.6 years; height: 181.6 ± 5.8 cm; body mass: 74.5 ± 5.6 kg; BMI: 21.8 ± 1.0 kg/m2) participated in this cohort study. Based on match participation, players were classified as starters (n = 10) or non-starters (n = 9). Data were collected over a 43-week period, including both training sessions and official matches. Physical activity metrics were recorded using GPS tracking devices (GPSPORTS Systems Pty Ltd).

Results and Conclusions

No significant differences were observed in training strain (TS) between the two groups during the pre-season and end-season phases. However, TS values during these periods were higher compared to the early- and mid-season. During the early and mid-season, significant differences ($p < 0.05$) in TS were found between starters and non-starters across all zones. Hedge's g analysis indicated large to very large effect sizes, favoring the starters. Across all zones and for both training monotony (TM) and TS, non-starters exhibited greater percentage changes and higher coefficients of variation. TM patterns showed oscillations forming W-shaped trends throughout the season. These findings highlight that training loads during the early- and mid-season may be inadequate for the non-starter group. Coaches are advised to implement more tailored and individualized training programs to ensure optimal development and performance readiness for non-starters.

Keywords: acceleration; deceleration; external monitoring; periodization; performance; GPS

When Physiology Also Plays: The Influence of the Menstrual Cycle on Female Athletes' Performance

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Introduction

For decades, research in sports medicine has used the male body as a reference model, overlooking the physiological particularities of the female body. This invisibility has led to a significant knowledge gap regarding how the menstrual cycle impacts athletic performance in women. The present study addresses this gap by analyzing the influence of different menstrual cycle phases on training load in semi-professional female basketball players.

Methods

The sample consisted of 12 athletes with regular menstrual cycles and no recent use of hormonal contraceptives. Using an ecological design, physical and cardiovascular variables were analyzed without altering the natural training environment. The data allowed the identification of two clusters: one corresponding to the menstrual and luteal phases, characterized by lower variability in training loads and higher perceived fatigue; and another covering the proliferative and ovulatory phases, where a greater predisposition to intense effort, accelerations, and lower perceived fatigue was observed.

Results and Conclusions

The results support previous studies associating ovulation with increased estrogen levels and enhanced performance, whereas menstruation is linked to fatigue and a higher risk of injury, particularly of the anterior cruciate ligament (ACL). The study concludes that training planning should consider hormonal fluctuations to optimize performance and reduce injury risk. This approach contributes to a more equitable and evidence-based sports practice that addresses the actual needs of female athletes.

Keywords: menstrual cycle, sports performance, female athlete, personalized training.

MARKET VALUE AND SPORTING PERFORMANCE IN THE SAUDI PRO LEAGUE: AN ANALYSIS OF THE LAST 10 YEARS

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Introduction

Introduction: In recent years, the Saudi Pro League has undergone a restructuring process driven by significant investments in national football. This movement has resulted in an increase in the market value of clubs, reflecting changes in the composition of the squads and the attractiveness of the league. Given this scenario, discussions have arisen about how these investments translate into sports performance on the field. Objective: To analyze the relationship between the market value of Saudi Pro League clubs and their sports performance over the 2013/2014 to 2023/2024 seasons.

Methods

Methodology: The study analyzed a sample of 180 clubs that participated in the Saudi Pro League® between the 2013/2014 and 2023/2024 seasons. Data were collected from the Transfermarkt platform, widely recognized for providing market value estimates and professional football statistics. Information on the clubs' market value and their respective final scores in each season were considered. Data normality was assessed using the Shapiro-Wilk test. Due to the nonparametric nature of the variables, Spearman's correlation was used to investigate the relationship between market value and sports performance. All analyses were conducted with a 5% significance level using GraphPad Prism software, version 8.01 (San Diego, CA, USA).

Results and Conclusions

Results: The results indicated a positive correlation between the market value of clubs and their final score in eight of the ten seasons analyzed. The correlations ranged from moderate to strong, with the 2016/2017 ($r = 0.91$), 2022/2023 ($r = 0.89$) and 2023/2024 ($r = 0.82$) seasons standing out, which presented particularly strong associations. These findings suggest that, in general, clubs with higher market value tend to achieve better performance in the Saudi Pro League. Conclusion: The results of this study indicate that, throughout the seasons analyzed, clubs with higher market value tend to achieve better performance in the Saudi Pro League. This association reinforces the influence of financial investments on the sporting results of the competition.

Keywords: Sports performance. Investment. Market value.

Worst-Case Scenarios in a Professional Men's Basketball Tournament: a Case Study

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Introduction

Analyzing average physical demands in professional basketball does not adequately reflect the peak intensities players face, known as Worst Case Scenarios (WCS), which can exceed average demands by up to 600% (Vázquez-Guerrero & Garcia, 2021).

Methods

This retrospective study analyzed two official games of a Spanish First Division team, with 12 players monitored using inertial measurement units. The three WCS per player and match were identified based on peak speed values within rolling one-minute windows. Descriptive, correlational, and t-test analyses were conducted.

Results and Conclusions

A total of 63 WCS were identified, with an average speed of 5.77±0.216 m/s (min. 5.3; max. 6.37). Of these, 48% occurred in the first quarter and 77% in the first half. Additionally, 21% of WCS occurred within the first two minutes of the game, and 32% within the first five. Notably, one of the WCS occurred immediately as the game started. Within each quarter, 26% were concentrated in the first two minutes. Regarding recurrence, 30% of WCS were repeated after three minutes and 17.5% after two. In 32% of cases, WCS were repeated twice within the same one-minute window, and 13% were repeated three times. A higher number of repetitions within a window was associated with greater volume but lower intensity. The most intense WCS occurred at the beginning of games or quarters and were typically isolated events. No correlation was found between WCS and total playing time per player. No significant differences were found between the semifinal and final, although a trend toward greater volume in the final and higher explosiveness in the semifinal was observed. In conclusion, players must be physically prepared to face peak intensity demands from the very start of the game, as well as to repeat high-volume efforts with short recovery periods. These findings should be considered when designing training tasks, ensuring appropriate regulation of both intensity and volume.

Keywords: Most Demanding Scenarios, WCS, Male, Match, Competition.

Effects on body composition of active and inactive adolescents of an intervention with mobile step-tracking apps

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Introduction

Adolescents have high rates of overweight and obesity, which affects their health. Interventions with mobile apps appear to show promise in reversing this, although the effects of mobile apps in relation to previous physical activity levels are unknown. Therefore, the aim of the study was to analyse the effect of an intervention with mobile step-tracking applications promoted by Physical Education on the body composition of active and inactive adolescents.

Methods

430 adolescents (mean age: 13.76±1.41 years) participated in a 10-week randomised controlled trial. Adolescents were classified into active and inactive and randomly assigned to the experimental group (EG) and control (CG). Adolescents in the GE were randomly assigned to one of the following apps: Pokémon Go, Strava, Pacer and MapMyWalk. Body composition was measured before and after the intervention.

Results and Conclusions

In the inactive adolescents of the CG we found an increase in body mass ($p<0.001$), height ($p<0.001$), body mass index (BMI) ($p=0.008$), corrected arm and thigh girth ($p<0.001$) and muscle mass ($p<0.001$), but a decrease in the sum of the 3 skinfolds ($p=0.018$). Inactive CG adolescents increased body mass ($p=0.003$), BMI ($p=0.013$), corrected arm girth ($p=0.002$), corrected calf girth ($p=0.015$) and muscle mass ($p=0.005$). Active GE adolescents increased body mass ($p<0.001$), height ($p<0.001$), corrected arm and thigh girth ($p<0.001$) and muscle mass ($p<0.001$); while fat mass ($p=0.028$) and the sum of the 3 skinfolds ($p=0.036$) decreased after the intervention. Active CG adolescents increased body mass ($p<0.001$), height ($p<0.001$), BMI ($p<0.001$), corrected arm girth ($p<0.001$), corrected calf girth ($p=0.029$) and muscle mass ($p=0.001$). Therefore, it can be concluded that mobile apps seem to be a good option for modifying the body composition of adolescents, regardless of their previous level of physical activity.

Keywords: Adolescents; Mobile step-tracking apps; Body composition.

Influence of adolescents' level of physical activity on the rating of mobile step-tracking applications

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Introduction

Mobile apps are considered useful tools to promote physical activity in the adolescent population. However, after the first few weeks of use, the initial novelty wears off and adolescents lose adherence to the intervention. This could be due to the type of design of these apps and the previous level of physical activity of the adolescents, but no previous research is known in this regard. Therefore, the objectives were: a) to analyse differences in the rating of mobile apps according to adolescents' previous level of physical activity; and b) to analyse differences in the rating of mobile apps according to the mobile app used.

Methods

A total of 240 adolescents (mean age: 13.76±1.41 years) participated in a ten-week quasi-experimental study. Adolescents were classified into active and inactive and used three times per week during out-of-school hours one of the following mobile apps: Pokémon-Go, Pacer, Strava and MapMyWalk. The Physical Activity Questionnaire for Adolescents (PAQ-A) and the user version of the Mobile App Rating Scale (uMARS) were completed before and after the intervention.

Results and Conclusions

No differences were found in the rating of mobile apps between active and inactive adolescents in terms of engagement (p=0.560-0.761), functionality (p=0.566-0.977), aesthetics (p=0.669-0.960), information (p=0.408-0.862), usability (p=0.299-0.805) and perceived impact (p=0.195-0.934). No significant differences were found according to the app used in the group of inactive adolescents in engagement (p=0.675), functionality (p=0.223), aesthetics (p=0.345), information (p=0.304), usability (p=0.335) and perceived impact (p=0.335). 335) and perceived impact (p=0.599), nor in the active group in engagement (p=0.972), functionality (p=0.477), aesthetics (p=0.622), information (p=0.255), usability (p=0.163), perceived impact (p=0.484). In conclusion, the assessment of mobile step-tracking applications does not differ according to the level of physical activity of adolescents.

Keywords: Adolescents; Mobile step-tracking applications; Assessment.

CORRELATIONS BETWEEN PHYSICAL AND TECHNICAL ASPECTS IN U10 FUTSAL PLAYERS

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Introduction

Futsal is an invasion team sport played on a court that demands quick decision-making during the game. Performance in this modality is determined by the interaction of multiple dimensions, encompassing both physical capacities and technical skills. Considering any of these elements in isolation may limit athlete development, especially during the early stages of sports participation, when understanding the different factors that influence performance becomes even more relevant. Therefore, this study aimed to analyze the correlations between physical and technical variables in under-10 futsal players.

Methods

Twenty-two athletes (8.86 ± 0.35 years old) underwent physical and technical assessments on two separate days, with a 48-hour interval between sessions. Measurements included height, body mass, body mass index (BMI), vertical jump, 20-meter sprint, change of direction ability (T-test), as well as technical skills of passing and ball control. Pearson's correlation coefficient was used to assess the strength and direction of linear relationships between variables, with the significance level set at $p<0.05$.

Results and Conclusions

A consistent pattern of significant correlations was observed between physical and technical variables in under-10 futsal players. A strong association was found between the T-test and the 20-meter sprint ($r = 0.9$), indicating that players with lower change of direction ability tend to have poorer linear sprint performance. Additionally, the T-test showed positive correlations with body mass ($r = 0.6$) and BMI ($r = 0.6$), suggesting that higher body mass may negatively impact change of direction performance. The 20-meter sprint also correlated positively with height ($r = 0.5$), body mass ($r = 0.7$), and BMI ($r = 0.6$), pointing to a possible influence of anthropometric characteristics on sprint performance. Negative correlations were found between the vertical jump and both the 20-meter sprint ($r = -0.7$) and the T-test ($r = -0.6$), indicating that greater lower-limb power is associated with better performance in both linear sprint and change of direction. Interestingly, passing performance did not show significant correlations with any of the physical variables, suggesting that this technical skill, at least in this age group, is less dependent on the physical attributes evaluated. These findings reinforce the interdependence between physical capacities and technical components in youth futsal, highlighting that motor development at this stage is multifactorial. Understanding these interactions contributes to optimizing training planning, considering the specific physical and technical demands of youth futsal. Furthermore, longitudinal monitoring of these

athletes is recommended to assess how these correlations evolve throughout growth and maturational changes.

Keywords: athletic development, youth athletes, sports training.

Impact of the phases of the menstrual cycle along a gradual exercise test

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Introduction

Along the different phases of the menstrual cycle (PMC) exists a fluctuation of different hormones, as luteinizing hormone (LH) and follicle-stimulating hormone (FSH) which could affect to the metabolism during exercise. As the physiological response to exercise induces to different training adaptation, it is very important to know the influence of PMC in the response to exercise. The gradual exercise test is the gold standard for the assessment of the volume of oxygen maximum (VO2max). VO2max is one of the more sensible parameters of the physical condition and athletes of the most of the sport modalities include training sessions for enhancing it. Therefore, the aim of the present study is to analyse the impact of the different PMC along a gradual exercise test.

Methods

This review was designed attending to the next PICO criteria: i) Participants: female athletes; ii) Intervention: different PMC; iii) follicular vs ovulatory vs luteal phases; iv) outcomes: gradual exercise tests. Keywords related with the PICO criteria were used in a search strategy combined with Boolean connectors in Web of Science and Pubmed.

Results and Conclusions

A total of 198 articles were identified as potentially selective after discarding duplicates results (n=2443) and irrelevant studies (n=4591). A total of 9 articles fulfilled all the inclusion criteria and were selected for this review. Seven studies analyzed treadmille procedures while one research analyzed cyclerogmeter and another study both, cyclergometer and treadmille. The results of the studies included in this review suggest a nenligible effect of PMC with a plausible increasement of the time to exhaustion and velocity reached in a gradual exercise in the follicular phase in comparison with luteal phase. This little increasement of the maximal performance could be explained by an increased of carbohydrate metabolism contribution to the energetic metabolism and could be more accentuated in conditions that increase glycolitic metabolism (i.e., hot temperature combined with humidity). However this systematic review that PMC does not influence significantly in physical performance in female athletes, high interval training sessions focused in a predominance of glycolytic metabolism could be optimal

along the follicular phase. Therefore, a periodized training could modify the training sessions with a different internal load demands along the menstrual cycle for optimizing training adaptations in female athletes.

Keywords: Aerobic; Athlete; Endurance; Female; Sport

MAXIMAL ISOMETRIC HIP ABDUCTION STRENGTH ASSESSMENT: A SYSTEMATIC REVIEW

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Introduction

In the field of sports assessment, the measurement of maximal isometric strength (MIS) using hand-held dynamometry (HHD) has become a key tool for clinical, sports, and research professionals. Within this context, assessing the strength of the hip abductor muscles (HABD) has gained particular importance due to it is role in injury prevention, sports performance, and functional rehabilitation. However, there is no methodological consensus regarding the best subject position, the placement of the HHD, or the most appropriate device type to obtain reliable and valid measurements. Additionally, the examiner's influence has been identified as a crucial factor, as their strength level, experience, and consistency in applying the dynamometer can significantly affect measurement accuracy, especially when external stabilization systems are not used. The aim of this study was to analyze and describe the methodological characteristics of protocols used to assess MIS of the HABD in healthy adults and athletes, in order to identify their advantages, limitations, and practical applications.

Methods

Searches were conducted in the following databases: PubMed, Web of Science, and Google Scholar. The search included the following terms: (a) isometric strength; (b) hip abduction; (c) dynamometry; and (d) assessment protocols. Inclusion criteria were: (a) scientific articles published between 2004 and 2023; (b) use of dynamometry; (c) assessment of MIS of the HABD; (d) studies involving healthy adults or athletes; and (e) detailed inclusion of the measurement protocol. Studies involving pathological subjects or lacking technical specification of the procedure were excluded. A total of 12 articles were selected following a screening and basic methodological evaluation process.

Results and Conclusions

Results. MIS assessment of the ABD was categorized into three main groups: supine position (SP), side-lying position (SL), and standing position (ST), with sub-variants based on joint flexion of the knee and hip (neutral, 45º, or 90º) and dynamometer placement either proximally at the lateral femoral condyle of the knee (LFCK) or distally at the lateral malleolus of the ankle (LMA). The SP with application at the knee showed greater standardization and control of the proximal segment, whereas the SL position enhanced functional activation and allowed for gravity-resisted testing. On the other hand, the ST position better simulated daily or sports activities but introduced greater variability due to the balance required. Conclusion. It can be concluded that the chosen position and the application point of the HHD significantly influence the recorded MIS. More functional positions, such as SL with flexion or ST, offer advantages in sports

contexts, while more controlled positions, such as SP, are more suitable for simpler and more reliable evaluations. Likewise, it is essential to consider the examiner's influence during the measurement, encouraging standardized examiner training and, when possible, the use of external stabilization systems to minimize error.

Keywords: Hip; dynamometry; reference values; injury risk.

Descriptive work on how the four menstrual cycles affect strength in different athletes

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Introduction

Hormonal variations of the menstrual cycle affect female sports performance (Meignié et al., 2021; Miyazaki & Maeda, 2022). Most studies focus on men, leaving a gap in the research (Pallavi et al., 2017). It has been observed that strength and fatigue vary according to the menstrual phase (Meignié et al., 2021). This study analyzes how strength training relates to those phases to optimize performance (Miyazaki & Maeda, 2022).

Methods

This quantitative and experimental study will evaluate the acceleration in weightlifting during different phases of the menstrual cycle over two months. Between 11 and 20 women aged 18 to 35, with regular cycles and not using contraceptives, will participate. The cycle will be recorded using the Clue® app and acceleration will be measured with the T-FORCE V2 accelerometer. The protocol includes familiarization, specific warm-up, and fatigue control using the RPE scale (Wilson et al., 2025; Zhao et al., 2023). We analyzed the data using descriptive statistics and repeated measures ANOVA, seeking correlations between acceleration and hormonal phases. All ethical principles and informed consent will be upheld.

Results and Conclusions

Results: The phases of the menstrual cycle were compared in terms of acceleration in weightlifting. The greatest positive difference was observed between the follicular phase and the ovulatory phase (0.08078). The differences between follicular and luteal (0.03408) and between follicular and menstruation (-0.03242) were smaller. Additionally, it was observed that the value of Cohen's d variable when comparing the luteal, follicular, and menstrual phases with the ovulatory phase yielded values greater than or equal to 0.8, indicating a large difference between the measures that could have a statistically significant impact. Conclusion: The data suggest a greater acceleration during the ovulatory phase compared to other phases, which could be related to hormonal peaks associated with better performance. Providing, then, valuable information for strength training in women, where the goal is to minimize fatigue and achieve good athlete performance. But additionally, it is recommended to extend the sample collection period to obtain more statistically significant values, which would allow for further expansion of knowledge in this area of female strength training.

Keywords: menstrual cycle, strength training, acceleration, sports performance.

Exercise readiness level in male futsal athletes from a university tournament (UFV)

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Introduction

The Physical Activity Readiness Questionnaire (PAR-Q), originally proposed by Shephard in 1988, was designed to identify individuals for whom physical activity might be inappropriate or who may require medical guidance before beginning exercise. The questionnaire consists of seven dichotomous (yes/no) items assessing factors such as cardiac conditions, fainting episodes, musculoskeletal issues, and age. This study aimed to assess the level of readiness for physical activity among male futsal athletes participating in a university tournament.

Methods

This study was approved by the Human Research Ethics Committee of the Federal University of Viçosa (UFV). A total of 54 athletes competing in the futsal tournament at UFV's Florestal Campus were recruited. The PAR-Q was administered in person via a Google Forms link, preserving all original questions from the 1988 publication. Anthropometric data were collected for sample characterization: age (20 ± 1.86 years), weight (69.4 ± 10.34 kg), and height (1.80 ± 0.07 m). Descriptive statistics were used for data analysis.

Results and Conclusions

Four athletes (7.41% of the sample) were considered unfit for physical activity, having answered "yes" to more than one PAR-Q question. This percentage is relatively low compared to other studies, which report unfitness rates around 40%. The most frequently marked items were: "Has your doctor ever said you have heart trouble?", "Has a doctor ever said your blood pressure was too high?", and "Has your doctor ever told you that you have a bone or joint problem such as arthritis that has been aggravated by exercise, or might be made worse with exercise?". Based on these results, we conclude that the level of readiness for physical activity among male futsal athletes in this university tournament is high (92.59%). The findings support the development of planning and instructional strategies for use in practical physical education settings.

Keywords: Questionnaire; Physical Activity; Health

EFFECTS OF A DETRAINING PERIOD AFTER A RESISTANCE TRAINING INTERVENTION WITH DIFFERENT VELOCITY LOSS THRESHOLDS ON THE CONTRACTILE PROPERTIES OF THE VASTUS LATERALIS

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Introduction

Velocity loss (VL) is established as a metric to determine induced fatigue during resistance training (RT) (Sánchez-Medina & González-Badillo, 2011). Regarding long-term adaptations, it is known that a higher VL threshold would yield decrements in the contractile properties of the knee extensor muscles (Pareja-Blanco et al., 2020). However, no evidence exists regarding the residual effects of VL on contractile properties after a detraining period. Therefore, the aim of this study was to compare the effects of two RT programs with different VL thresholds (i.e., 20% vs. 40%) on contractile properties of the vastus lateralis after an RT intervention and a detraining period.

Methods

Forty-four physically active men followed an 8-week RT program based on the full-squat (SQ) exercise (16 sessions). Subjects were randomly allocated into the two intervention groups that differed in the VL attained within the set (VL20: 20%; VL40: 40%). The relative intensity (65-80% 1-RM), inter-set recovery (4 minutes), and number of sets (3) were matched for both groups. Subjects were evaluated on three occasions: pre-training (PRE), post-training (POST), and after 3 weeks of detraining (DET) with Tensiomyography (TMG). The following variables were assessed: maximal radial displacement (Dm), contraction time (Tc), delay time (Td), and velocity of deformation (Vd).

Results and Conclusions

RESULTS: No significant “group x time” interactions were observed. Significant “time” effects were found for all TMG variables analysed. Vd and Dm significantly increased after DET period in both groups. CONCLUSIONS: Despite the level of induced fatigue, after 3 weeks of detraining, both Dm and Vd increased, reflecting in a structural deconditioning of the muscle. This suggests the muscles became softer and less effective in their response after a training cessation.

Keywords: Fatigue, Velocity Based Training, TMG, Contractile Properties

The Influence of Pre-Workout Nutrition on Athletic Performance

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Introduction

Pre-exercise nutrition plays a fundamental role in optimising physical performance and supporting post-exercise recovery. Adequate nutritional strategies before training can significantly influence endurance, muscle function, fatigue resistance, and body composition, especially in sports or activities of high intensity or long duration. Therefore, the aim of this study was to examine the influence of pre-workout nutrition on athletic performance, focusing on the role of macronutrients, micronutrients, and hydration.

Methods

A systematic literature review was conducted using the PubMed database, selecting peer-reviewed articles published in the last ten years. Inclusion criteria comprised studies involving physically active individuals or athletes that addressed the effects of nutrition before training or competition. The analysis was guided by scientific rigor, clarity, and relevance to the topic.

Results and Conclusions

The main findings show that carbohydrate intake before training increases glycogen stores and delays fatigue, protein consumption contributes to muscle maintenance and recovery, and adequate hydration enhances thermoregulation and cardiovascular function. Micronutrients such as B vitamins, vitamin D, sodium, and potassium are essential for energy metabolism and muscular function. Pre-workout hydration, particularly in warm or humid environments, was associated with improved endurance and reduced risk of dehydration-related performance declines. In conclusion, personalised and well-timed pre-exercise nutritional strategies that combine balanced macronutrient intake with proper hydration can significantly enhance physical performance and protect health in both recreational and competitive athletes.

Keywords: Pre-exercise nutrition, athletic performance, carbohydrates, hydration, micronutrients.

Timing Nutrition

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Introduction

Nutritional timing has gained relevance in sports nutrition due to its potential impact on performance, recovery, and physiological adaptations. The concept of the "anabolic window" has been widely discussed, particularly in relation to protein intake and muscle protein synthesis after training. The aim of this work was to critically evaluate the relevance of nutrient timing and compare different approaches depending on exercise modality and metabolic demands.

Methods

This study was conducted through a qualitative literature review based on six scientific articles. The analysis focused on timing strategies for macronutrient intake, considering differences between strength training and endurance exercise, as well as the influence of individual goals such as hypertrophy, endurance, and performance.

Results and Conclusions

The findings highlight that nutrient timing can contribute to improved training adaptations, particularly when combining protein and carbohydrates before and after exercise. However, results support a more flexible and individualized approach, showing that timing should be considered in conjunction with total daily energy and protein intake, nutrient quality, and overall dietary context. In conclusion, tailored nutritional strategies are more effective than rigid rules, supporting a comprehensive approach to performance enhancement and recovery.

Keywords: Nutrition, protein, timing, diet, recovery

The Importance of Carbohydrates in Athletes' Performance

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Introduction

Carbohydrates are one of the main macronutrients in the diet and represent the primary energy source during high-intensity physical activities. Their intake is strongly associated with performance maintenance and recovery capacity in athletes. The purpose of this study was to gather and analyse scientific evidence on the importance of carbohydrates in sports performance and recovery.

Methods

A literature review was conducted using databases such as PubMed and ResearchGate. Six scientific articles published within the last ten years were selected based on their relevance to the topic and scientific quality.

Results and Conclusions

The analysed studies indicate that carbohydrate intake has a significant impact on performance and recovery, although requirements vary according to sport type, effort duration, and individual athlete characteristics. While some evidence prioritised exercise performance, other studies highlighted recovery benefits at muscular and physiological levels. In endurance contexts, intakes as high as 120 g/h showed significant benefits, whereas intakes between 39 g/h and 64 g/h were also considered effective. In conclusion, well-planned carbohydrate strategies, adapted to the modality and athlete needs, play a key role in optimising sports performance.

Keywords: Carbohydrates, athletes, performance, energy, macronutrient

The Importance of Sports Nutrition and Supplementation for Athletes Performance

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Introduction

Sports nutrition and supplementation play a crucial role in supporting athletic performance, enhancing recovery, and preventing injuries. Adequate intake of macronutrients, micronutrients, and fluids contributes to both training and competition outcomes. The aim of this work was to understand the importance of nutrition and supplementation in athletes' routines, emphasising the relevance of individual approaches depending on the sport modality and athlete needs.

Methods

A qualitative methodology was used through a review of scientific literature. Articles were selected using academic search engines, including PubMed, ScienceDirect, and Google Scholar, prioritising recency, credibility, and thematic relevance. The selected evidence was analysed and discussed to support conclusions.

Results and Conclusions

The analysis revealed that many athletes fail to consistently meet daily nutritional recommendations, particularly regarding carbohydrate and protein intake, which may negatively affect performance and recovery. Adequate hydration and mineral balance were also identified as essential factors. Regarding supplementation, substances such as protein, creatine, and magnesium were shown to provide benefits, provided their use is guided by qualified professionals. In conclusion, a well-oriented diet combined with appropriate supplementation strategies is fundamental for optimising athletic performance and maintaining long-term health.

Keywords: Sports nutrition, supplementation, athletic performance, macronutrients, hydration.

Creatine Supplementation and Its Benefits

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Introduction

Creatine is one of the most popular and well-studied supplements in sports nutrition, widely used for its benefits in strength development and muscle recovery. Beyond athletic performance, creatine supplementation has been increasingly investigated in aging populations and clinical contexts. This study aimed to verify the impact of creatine supplementation in young and older individuals and its benefits in sports and clinical settings, including aging and brain health.

Methods

A literature review was conducted using the PubMed database. Five scientific articles were selected and analysed based on relevance to the proposed objectives.

Results and Conclusions

The reviewed evidence indicates that creatine improves performance in short-term, high-intensity exercise without significant short-term adverse effects. In older adults, supplementation combined with resistance training promoted relevant gains in strength and lean mass (up to +3 kg), fat reduction, and improved quality of life. In clinical contexts, creatine showed benefits in muscle preservation during immobilization, postoperative recovery, and some neuromuscular diseases, although results varied across studies. Neurologically, increased brain creatine levels (up to 10%) and improved cognitive function were observed, particularly during mental fatigue, with the creatine precursor GAA showing an even greater increase (up to 16%). In conclusion, creatine supplementation presents multiple benefits across athletic, clinical, and aging populations, supporting muscle function, recovery, and mental health.

Keywords: Creatine, supplementation, muscle mass, training, muscle function

Creatine Effects on Resistance Training and Muscular Strength

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Introduction

Creatine is among the most researched supplements in sports nutrition, frequently used to enhance performance in resistance training and improve muscle strength. This work aimed to investigate the effects of creatine supplementation, identifying potential benefits in muscular resistance and strength outcomes.

Methods

This study was based on the analysis of four scientific articles addressing creatine supplementation in different contexts, including strength performance, combined supplementation protocols, age-related variability, and hypertrophy-focused resistance training.

Results and Conclusions

The evidence reviewed suggests that creatine supplementation can significantly improve maximal repetition strength, with increases reported up to 20%. In comparative supplementation trials over six weeks, creatine showed greater isolated benefits than caffeine or combined protocols. Studies examining age-related effects highlighted the importance of considering age as a variable in resistance training outcomes. In hypertrophy-oriented protocols assessed through imaging techniques, creatine supplementation produced only minimal gains compared to non-supplemented training. Importantly, none of the reviewed studies reported significant negative effects, reinforcing the safety of creatine at recommended doses. In conclusion, creatine remains an effective and safe supplement for enhancing performance in high-intensity resistance training and supporting physical performance.

Keywords: Supplementation, performance, muscle strength, endurance, creatine

Kinematic Analysis of Bandal Tchagui Kick in Taekwondo: Dominant Versus Non-Dominant Leg Analysis

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Introduction

The Bandal Tchagui technique in Taekwondo is one of the most frequently used. Although it may appear to be a simple gesture, it involves high motor complexity, requiring angular control, acceleration, and speed. Therefore, the aim of this study was to analyse the biomechanical differences in the execution of Bandal Tchagui with the dominant and non-dominant leg, specifically in terms of angular amplitude, speed, and acceleration.

Methods

The sample consisted of 11 athletes (age: 20 ± 12.27 years; height: 1.62 ± 0.16 m; weight: 57 ± 14.92 kg), including 4 left-footed and 7 right-footed athletes. Each athlete performed two kicks, one with the dominant leg and one with the non-dominant leg. Data collection was performed using the Kinovea program.

Results and Conclusions

In the preparatory phase of the movement, the average angular amplitude was 170.3º with the dominant leg and 166.2º with the non-dominant leg. At the moment of impact, the values were 173.5º and 173.3º, respectively. The average speed was slightly higher with the non-dominant leg (difference of 0.55 m/s), as was acceleration. Minor angular differences were found between legs; however, the non-dominant leg showed greater acceleration and speed, suggesting a motor adaptation that challenges the presumed superiority of the dominant leg.

Keywords: Taekwondo, Bandal Tchagui, kinematics, dominant leg, non-dominant leg.

Kinematic Analysis of Static and Jump Shots in Basketball

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Introduction

The throw represents the gesture that players use when, during a game, they find themselves with no path to advance to the basket and have to score from a certain distance. The throwing gesture was perfected so that the trajectory of the ball achieves the optimal angle to enter the basket. This study aimed to analyse the basic technical gesture of static and jump basketball shots.

Methods

Ten students (GA: 20 years ± 3 years; 1.76 m ± 0.11 m; 70.9 kg ± 20.1 kg) performed a throw without jumping and a jump throw on the free throw line (5.8 m).

Results and Conclusions

In the initial phase of the throw without jump, the student presented the arm at an angle of approximately 96.3º (± 8º). In the initial phase of the throw with jump, the arm angle was 99.2º (± 16.3º). Overall, only small angular differences were observed between the two shooting conditions.

Keywords: Static shot, jump shot, basketball, kinematic analysis.

Kinematic Analysis of the Corsa Foot-to-Head Jump

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Introduction

The corsa foot-to-head jump represents a technical gesture frequently used in rhythmic gymnastics exercises involving body difficulty evaluation. This movement requires specific technical execution and muscular adaptations to optimise efficiency. The aim of this study was to analyse the corsa foot-to-head jump technique between professionals and amateurs.

Methods

Five rhythmic gymnastics athletes who train daily (GA: 13.2 ± 3.27 years; 157.4 ± 15.96 cm; 47.4 ± 12.44 kg) and five IPS students (GA: 19.6 ± 2.51 years; 168 ± 7.18 cm; 67.4 ± 8.99 kg) performed the corsa foot-to-head jump.

Results and Conclusions

During the flight phase of the jump with the best leg, athletes registered amplitudes of 118.88 ± 20.17º (1st frame) and 120.98 ± 17.42º (2nd frame), with angles of 16.23 ± 5.17º and 7.79 ± 4.80º, respectively. Students registered lower amplitudes and substantially higher angles with the best leg. With the worst leg, athletes presented amplitudes of 129.67 ± 22.74º and 129.76 ± 21.78º, while students showed lower amplitudes and higher variability. Significant variations in angles were observed between athletes and non-athletes, indicating differences in technique efficiency and control.

Keywords: Biomechanics, kinematics, leap, movement, rhythmic gymnastics

Analysis of the Step Shot in Basketball: Comparison Between Dominant and Non-Dominant Hand and Leg

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Introduction

The step shot is a fundamental technical gesture in basketball, primarily used in offensive situations to score points. This study aimed to analyse the step shot technique by comparing execution with dominant and non-dominant hand and leg, focusing on elbow joint angles and vertical displacement.

Methods

Ten players from the Polytechnic Institute of Setúbal Academic Basketball Team, aged 19 to 24 years (average 21 years), performed shots with both dominant and non-dominant sides. Video analysis was conducted using the Kinovea software.

Results and Conclusions

The average elbow movement amplitude was greater with the dominant hand (79.36º) compared to the non-dominant hand (64.19º). Vertical displacement was also higher for the dominant leg (54.91 cm) versus the non-dominant leg (53.73 cm). The dominant side demonstrated a slightly higher technical efficiency; however, the differences were not large, suggesting functional balance between limbs.

Keywords: Biomechanics, movement analysis, basketball, step shot

Kinematic Analysis of the Heading in Football With and Without a Jump

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Introduction

Heading a soccer ball is an essential technical gesture that involves the transfer of kinetic energy from the body to the ball in offensive and defensive situations. This action requires dynamic coordination between the trunk, lower limbs, head, and postural control. This study aimed to compare the kinematic characteristics of jumping and non-jumping heading in amateur athletes.

Methods

Ten amateur athletes (GA: 19.6 ± 5.63 years; 170.2 ± 9.96 cm; 65.3 ± 9.95 kg) performed, in random order, jumping and non-jumping headings at the 5.50-meter line.

Results and Conclusions

In the initial phase of the header without jumping, athletes registered 139.8 ± 28.9º, and with jumping 121.6 ± 49.5º. In the heading phase, athletes registered 134.2 ± 29.8º without jumping and 132.2 ± 30.6º with jumping. Ball speed after contact was 6.26 ± 1.45 m/s without jumping and 5.87 ± 1.56 m/s with jumping. Results indicate that the header without jumping presents a greater initial angle and a slight advantage in ball speed compared to heading with a jump.

Keywords: Biomechanics, kinematics, heading, football

Biomechanical and Kinesiological Analysis of the Barbell Back Squat Exercise

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Introduction

The barbell back squat is a fundamental multi-joint exercise in strength training, requiring coordination between the ankle, knee, hip, and trunk stabilization. This study aimed to biomechanically analyse the descending phase of the movement in individuals with different physical and motor profiles.

Methods

Five participants performed three repetitions of the exercise with moderate load. The best execution was analysed using video analysis with Kinovea software. Knee joint angles were recorded for each participant.

Results and Conclusions

Knee joint angles recorded were: Catarina (104.3º), Nuno (102.6º), Participant A (97.4º), Participant B (100.1º), and Participant C (95.2º). The results showed individual variations related to mobility, neuromuscular control, and training context. It is concluded that squat performance reflects not only biomechanical factors but also sociocultural and historical aspects, highlighting the importance of individualized analysis and exercise prescription.

Keywords: Biomechanics, kinesiology, squat, movement, kinematic analysis

Readiness Level for Physical Exercise in Female Futsal Athletes from a University Tournament (UFV)

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Introduction

Developed as a pre-exercise screening tool, the Physical Activity Readiness Questionnaire (PAR-Q) facilitates the identification of individuals who may require medical consultation before initiating training programs. This assessment consists of seven binary-response items that evaluate cardiovascular risk factors, history of syncope, musculoskeletal limitations, and age-related considerations. The present study aimed to assess the level of readiness for physical activity among female collegiate futsal athletes participating in interuniversity competitions.

Methods

Thirteen competitive futsal athletes from the Federal University of Viçosa's Florestal Campus were enrolled in this study. The standardized PAR-Q was administered digitally during scheduled team sessions, maintaining all original items from the 1988 version. Anthropometric data were recorded, including age (22 ± 3.66 years), body mass (58.91 ± 9.62 kg), and height (1.61 ± 0.04 m). The study received ethical approval from the university's Human Research Ethics Committee (UFV-CEPH). Data analysis was conducted using basic descriptive statistics.

Results and Conclusions

Five athletes (38.46% of the sample) presented multiple positive responses indicating the need for exercise restriction, consistent with previous studies reporting ineligibility rates of approximately 40%. The most frequently reported issues included recurrent dizziness, physician-diagnosed hypertension, and joint problems exacerbated by physical activity. A clearance rate of 61.54% for unrestricted participation suggests notable preparedness gaps among these collegiate athletes. These findings underscore the importance of implementing targeted training protocols and comprehensive pre-participation health screenings in university athletic programs.

Keywords: PAR-Q, physical activity, pre-participation screening, college athletes

Nuevas ecuaciones antropométricas para la estimación segmentaria de masa libre de grasa en hombres físicamente activos.

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Introdução/Introduccion

La estimación segmentaria de la masa libre de grasa (MLG) es fundamental en disciplinas deportivas con acciones unilaterales, donde pueden generarse asimetrías relevantes en la distribución de la composición corporal (1,2). Aunque la antropometría es una técnica ampliamente utilizada por su accesibilidad y bajo coste, actualmente carece de estrategias validadas para estimar la MLG de forma segmentaria (3). Este estudio tuvo como objetivo desarrollar ecuaciones de predicción basadas en variables antropométricas para estimar la MLG en hombres jóvenes físicamente activos, utilizando como referencia la absorciometría dual de rayos X (DXA).

Métodos/Metodologia

Se realizó un estudio transversal en 157 hombres adultos jóvenes (22,3 ± 3,41 años), evaluados mediante protocolos estandarizados de DXA y antropometría según protocolo ISAK en ambos lados del cuerpo. Se estimó mediante DXA la MLG en ambos miembros superiores, tronco y ambos miembros inferiores. A partir de estas mediciones, se construyeron ecuaciones de regresión lineal múltiple utilizando variables antropométricas, con DXA como referencia.

Resultados e Conclusões/Resultados y Conclusiones

Las ecuaciones desarrolladas mediante variables antropométricas mostraron alta capacidad predictiva en todos los segmentos corporales ($r2 > 0,750$) respecto a DXA. Las variables más relevantes para estimar la MLG fueron la masa corporal en el tronco, los perímetros corregidos del brazo en los miembros superiores, los perímetros corregidos del muslo y la pierna, y las alturas Iliospinale y trochanterion en los miembros inferiores. En conclusión, las ecuaciones propuestas ofrecen una herramienta válida para estimar la MLG segmentaria en hombres jóvenes físicamente activos mediante antropometría. Esta alternativa resulta útil en contextos de campo por su bajo coste, aplicabilidad y disponibilidad, y permite cubrir una limitación actual en la evaluación regional de la composición corporal mediante antropometría.

Keywords: Composición corporal, masa libre de grasa, antropometría, ecuaciones de predicción.

Comparación del DXA y BIA en la estimación de masa libre de grasa en adultos jóvenes físicamente activos

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Introdução/Introduccion

La estimación segmentaria de la masa libre de grasa (MLG) es clave en contextos deportivos, especialmente en disciplinas con acciones unilaterales. Aunque estudios previos han demostrado que la absorciometría dual de rayos X (DXA) y la bioimpedancia eléctrica (BIA) no son intercambiables a nivel general, aún existen dudas respecto a la comparabilidad de sus resultados a nivel segmentario. Este estudio tuvo como objetivo comparar la estimación de la MLG entre DXA y BIA en distintos segmentos corporales, y evaluar su grado de concordancia en adultos jóvenes físicamente activos.

Métodos/Metodologia

Participaron 258 adultos jóvenes físicamente activos (157 hombres, 101 mujeres; 22,3 ± 3,41 años). Se evaluó la MLG (kg y %) en ambos miembros superiores e inferiores y tronco mediante DXA (Hologic Horizon) y BIA (TANITA MC-780-MA), bajo estrictas condiciones de control de la hidratación mediante gravedad específica urinaria. Se utilizaron ANOVA, pruebas t de Student por sexo y análisis de Bland-Altman para la evaluación de diferencias y concordancia.

Resultados e Conclusões/Resultados y Conclusiones

Se encontraron diferencias significativas entre DXA y BIA en todos los segmentos y sexos para la estimación de la MLG ($p < 0,001$), excepto en el miembro inferior derecho de las mujeres ($p = 0,154$). El análisis de Bland-Altman no mostró concordancia entre ambos métodos en ningún segmento corporal ($p < 0,001$), salvo en el miembro superior derecho de las mujeres, donde sí se observó concordancia ($p = 0,167$). En general, BIA sobreestimó la MLG en el tronco y miembros superiores, y la subestimó en miembros inferiores. En conclusión, la BIA no puede considerarse una alternativa al DXA para la estimación segmentaria de la masa libre de grasa en adultos físicamente activos. Además, no deben realizarse comparaciones entre ambos métodos, ya que sus resultados no son intercambiables.

Keywords: Composición corporal segmentaria, masa libre de grasa, DXA, BIA.

Impacto de la composición corporal en el rendimiento físico de futbolistas femeninas de élite

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Introdução/Introduccion

Introducción El fútbol es uno de los deportes de equipo más practicados a nivel mundial. Para reducir la brecha existente entre los practicantes masculinos y femeninos, la FIFA lanzó su Estrategia de Fútbol Femenino (1). Nuestro objetivo fue analizar la influencia de la composición corporal sobre el rendimiento físico en jugadoras de fútbol femenino.

Métodos/Metodologia

Métodos Participaron 38 futbolistas de 2ª División española en un estudio transversal realizado durante la temporada competitiva. La composición corporal se evaluó mediante técnicas antropométricas estandarizadas (2). Las pruebas de rendimiento físico incluyeron salto con contramovimiento (CMJ), salto horizontal (SH), valocidad lineal (40 metros) y el cambio de dirección-505 (COD) (3).

Resultados e Conclusões/Resultados y Conclusiones

Resultados Los resultados mostraron correlaciones significativas entre la composición corporal y el sprint lineal. Se observó que, a mayor % de grasa corporal, el tiempo del sprint aumentaba ($r = -0.47$-$0.46/p < 0.05$). Por otro lado, también se observó que a mayor masa muscular y masa libre de grasa, el tiempo del sprint se reducía y el salto mejoraba. Por último, no se encontraron relaciones significativas entre la composición corporal y el COD. Discusión Estos hallazgos subrayan la importancia de mejorar la composición corporal y su influencia en el rendimiento físico de futbolistas femeninas de élite (4). Recomendamos a los entrenadores y profesionales de la preparación física que apliquen estrategias individualizadas de entrenamiento y nutrición para ello.

Keywords: Palabras clave: fútbol, cambio de dirección, mujeres, composición corporal, rendimiento

Evaluación objetiva del rendimiento en pádel: comparación entre rankings basados en resultados e inteligencia artificial.

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Introdução/Introduccion

La evaluación precisa del nivel de los jugadores de pádel amateur es crucial para optimizar los entrenamientos y garantizar la equidad competitiva. Actualmente, los rankings basados en resultados y autoevaluación, como Playtomic, presentan sesgos que comprometen su objetividad. La inteligencia artificial (IA) aplicada a través de visión por computador surge como una alternativa prometedora para proporcionar valoraciones inmediatas y objetivas del rendimiento deportivo.

Métodos/Metodologia

Se evaluó a 180 jugadores no profesionales de pádel de 9 clubes en España, a través de tres métodos: un ranking basado en autoevaluación (Playtomic), un sistema de IA que analiza partidos grabados (AIball) y la evaluación de un panel de cinco entrenadores expertos (considerada referencia). Se realizaron análisis de correlación de Pearson, coeficientes de correlación intraclase (ICC) y de concordancia de Lin (CCC), pruebas t para muestras relacionadas, análisis de Bland-Altman y métricas de error (MSE, RMSE y MAE) para comparar la fiabilidad y la concordancia entre los métodos.

Resultados e Conclusões/Resultados y Conclusiones

AIball mostró una mayor correlación y concordancia con las evaluaciones de los entrenadores ($r = 0.7769$; $CCC = 0.7144$) en comparación con Playtomic. Asimismo, presentó menores errores de predicción y mayor precisión en la clasificación de los jugadores. Estos resultados sugieren que los sistemas basados en IA proporcionan evaluaciones más objetivas y fiables que los métodos tradicionales de autoevaluación, con importantes implicaciones para la mejora de los programas de entrenamiento y la estandarización de los rankings en pádel amateur.

Keywords: Inteligencia artificial, pádel, evaluación del rendimiento, aprendizaje profundo, clasificación de jugadores

Validez de la BIA para el análisis de masa grasa segmentaria en hombres jóvenes y desarrollo de modelos predictivos mediante antropometría

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Introdução/Introduccion

La evaluación precisa de la masa grasa segmentaria es clave en salud y rendimiento, pero los métodos accesibles presentan limitaciones. Aunque la bioimpedancia (BIA) permite estimaciones regionales, su validez respecto a métodos como la DXA aún es debatida. La antropometría, por su parte, representa una alternativa económica con potencial para estimaciones segmentarias en contextos clínicos y deportivos.

Métodos/Metodologia

Se evaluó una muestra de 161 hombres jóvenes (23.04 ± 5.61 años) mediante DXA (GE Lunar iDXA), BIA multifrecuencia (TANITA MC-780-MA) y antropometría completa siguiendo el protocolo ISAK. Se midieron ambos lados del cuerpo con plicómetro Harpenden, y todas las mediciones fueron realizadas por un antropometrista acreditado ISAK nivel 3. Se analizaron las diferencias entre métodos mediante ANOVA de medidas repetidas y Bland-Altman. Se desarrollaron modelos de regresión multivariada para estimar la masa grasa segmentaria con antropometría, controlando por IMC y estado de hidratación (evaluado por gravedad específica urinaria).

Resultados e Conclusões/Resultados y Conclusiones

Se observaron diferencias significativas entre DXA y BIA en todos los segmentos analizados ($p < 0.001$), con sobreestimación por BIA en extremidades y subestimación en tronco. Los modelos antropométricos mostraron alta capacidad predictiva ($R^2 = 0.758–0.887$; $p < 0.001$). Las variables más relevantes fueron los pliegues periféricos para extremidades, y el pliegue supraspinale izquierdo para el tronco. Se concluye que BIA y DXA no son intercambiables para el análisis segmentario en hombres jóvenes, pero la antropometría representa una alternativa válida y de bajo costo.

Keywords: Composición corporal, grasa segmentaria, bioimpedancia, antropometría, DXA, hombres jóvenes

Potenciar la confianza en principiantes: el rol del tipo de instrucción en la autoeficacia durante el ejercicio

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Introdução/Introduccion

La autoeficacia es un factor determinante en la motivación, la adherencia y el rendimiento motor durante el entrenamiento físico, especialmente en personas sin experiencia previa. Sin embargo, existe escasa evidencia sobre cómo influyen distintas estrategias de instrucción verbal en esta variable psicológica en el contexto del entrenamiento de fuerza.

Métodos/Metodologia

Se aplicó un diseño cruzado aleatorizado con 20 participantes sin experiencia previa en entrenamiento de fuerza. Cada uno realizó intentos de peso muerto bajo tres condiciones: instrucción análoga (basada en metáforas), instrucción explícita (centrada en comandos técnicos y articulares) y una condición control sin orientación verbal específica. La autoeficacia fue evaluada inmediatamente después de cada condición mediante una escala validada.

Resultados e Conclusões/Resultados y Conclusiones

Los participantes mostraron niveles significativamente más altos de autoeficacia tras recibir instrucción análoga en comparación con las condiciones explícita y control ($p < .05$). Este efecto fue consistente en ambos sexos y se mantuvo independiente del rendimiento físico. La instrucción análoga parece ser más eficaz para potenciar la autoeficacia en individuos noveles que las instrucciones técnicas explícitas o la ausencia de instrucción. Estos resultados sugieren que el uso de un lenguaje metafórico puede favorecer un mayor estado de preparación psicológica en las primeras fases del aprendizaje motor. Las implicaciones son relevantes para contextos de entrenamiento, educación física y rehabilitación, donde la confianza inicial resulta fundamental para mantener el compromiso a largo plazo.

Keywords: autoeficacia, tipo de instrucción, metáforas, principiantes, entrenamiento de fuerza, aprendizaje motor

Vincular la alfabetización física a la salud mental

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Introdução/Introduccion

El concepto de alfabetización física ha ganado importancia en el contexto de la salud de los adolescentes, con una creciente evidencia que sugiere su potencial como factor fundamental en la promoción del bienestar y la actividad física de los adolescentes. El objetivo del presente estudio fue examinar las relaciones entre la alfabetización física percibida y los síntomas de depresión, ansiedad y estrés en adolescentes españoles.

Métodos/Metodologia

En este estudio transversal participaron 714 adolescentes. Los datos se recogieron utilizando el Instrumento de Alfabetización Física Percibida para Adolescentes (S-PPLI) y la Escala de Depresión, Ansiedad y Estrés-21 (DASS-21). Se emplearon modelos de regresión lineal robusta para analizar las asociaciones entre la alfabetización física percibida y los resultados de salud mental.

Resultados e Conclusões/Resultados y Conclusiones

Tras ajustar por diversas covariables, se observó una asociación inversa entre las puntuaciones de S-PPLI y todos los dominios de DASS-21. Una mayor alfabetización física percibida se relacionó significativamente con niveles más bajos de depresión, ansiedad y estrés. Los adolescentes con mayor PPL informaron notablemente de menos síntomas en los tres indicadores de salud mental en comparación con aquellos con menor PPL. Conclusiones: La alfabetización física percibida puede ser un factor protector contra la depresión, la ansiedad y el estrés en adolescentes. La mejora de la alfabetización física podría ser un componente crucial en el aprovechamiento de la actividad física para apoyar la salud mental de los adolescentes.

Keywords: Salud mental;Educación física;Actividad física;Jóvenes;Adolescentes

Correlação entre manifestações de força e capacidade funcional em mulheres idosas submetidas ao treinamento resistido tradicional

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Introdução/Introduccion

O processo de envelhecimento, mesmo na ausência de comorbidades, está associado a diversas alterações fisiológicas que contribuem para a redução da massa, força e funcionalidade do músculo esquelético. Nesse contexto, torna-se essencial a adoção de estratégias eficazes de prevenção e intervenção para preservar a saúde e o bem-estar da população idosa. Dentre essas estratégias, o treinamento resistido tradicional tem se destacado pelos efeitos positivos sobre a função neuromuscular e a capacidade funcional em idosos. Assim, este estudo teve como objetivo investigar a correlação entre as manifestações de força muscular e a capacidade funcional em mulheres idosas residentes na comunidade de Viçosa submetidas a um protocolo de treinamento resistido tradicional.

Métodos/Metodologia

Dezoito idosas realizaram 16 sessões do protocolo de treinamento resistido tradicional. As manifestações de força foram avaliadas por contração voluntária isométrica máxima, força dinâmica máxima (1RM) e potência muscular a 40%, 60 e 80% de 1RM na cadeira extensora bilateral. A capacidade funcional foi mensurada pelo Timed Up and Go (TUG) e Short Physical Performance Battery (SPPB). O teste de Shapiro-Wilk verificou a normalidade dos dados. O teste t de Student comparou as diferenças entre as manifestações de força muscular e a capacidade funcional. A correlação de Spearman analisou suas relações, classificadas como: ≤0,30 (muito fraco), 0,31-0,50 (fraco), 0,51-0,70 (moderado), 0,71-0,90 (forte) e ≥0,90 (muito forte). As análises foram feitas no GraphPad Prism, versão 8.01.

Resultados e Conclusões/Resultados y Conclusiones

A matriz de correlação revelou associações relevantes entre as manifestações de força muscular e a capacidade funcional. O desempenho no SPPB apresentou correlações positivas moderadas a fortes com todas as variáveis de força, sendo mais forte com a potência muscular a 60% de 1RM (r = 0,85), seguida pela potência a 80% (r = 0,73), indicando que maiores níveis de força dinâmica submáxima estão associados a melhor funcionalidade geral. O TUG correlacionou-se negativamente com as manifestações de força, com destaque para a força isométrica (r = -0,32) e a potência a 40% de 1RM (r = -0,38), sugerindo que maiores níveis de força contribuem para melhor mobilidade

funcional. Esses achados reforçam a importância do treinamento de força, especialmente em intensidades moderadas, na promoção da funcionalidade em idosas.

Keywords: Idosas; Força muscular; Capacidade funcional; Treinamento resistido; Mobilidade.

La creatina como una ayuda ergogénica para el regreso al juego en atletas con tendinopatía patelar

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Introdução/Introduccion

Existe un limitado número de suplementos deportivos que tienen capacidad de mejorar el rendimiento directamente o de forma indirecta, a través del aporte de nutrientes en situaciones con limitado acceso a alimentos o en el tratamiento o prevención de deficiencias nutricionales. Actualmente es limitada la información sobre las posibles propiedades ergogénicas de la suplementación con creatina para acelerar la vuelta a la competición en lesiones de gran prevalencia en el deporte como podría ser la tendinopatía rotuliana (TR).

Métodos/Metodologia

Veinte deportistas hombres federados diagnosticados con TR fueron asignados aleatoriamente a un grupo de suplementación con creatina (CR, n=9) o placebo (PLA, n=11). CR y PLA realizaron un programa de rehabilitación durante 8 semanas consistente en entrenamiento excéntrico (sentadilla unilateral declinada) y estiramientos a diario con 5 sesiones de ondas de choque extracorpóreas (OCE) y terapia manual. Durante la intervención, los participantes ingirieron 3 g/d de CR o PLA (sacarosa). Antes (PRE), a las 4 semanas (MID) y al finalizar las 8 semanas de intervención (POST), se analizó la capacidad de salto a través de un salto con contramovimiento (CMJ), fuerza muscular (5-RM con la pierna de la rodilla lesionada) y dolor (cuestionario VISA-P). Se realizó un análisis de la varianza para medidas repetidas (ANOVA-MR) con ajuste de Bonferroni usando el software estadístico JAMOVI (version 2.3.28).

Resultados e Conclusões/Resultados y Conclusiones

Ambos grupos mejoraron en el test de 5-RM ($F=79,25$; $p<0,01$; $\eta^2p=0,74$). El dolor se redujo durante la intervención ($p<0,01$; $\eta^2p=0,63$), aunque sólo CR redujo significativamente el dolor en MID (MID: 70,2 ± 13,3 puntos vs PRE: 60,6 ± 9,4 puntos; $t=-3,66$; $p=0,03$). Además, a diferencia de PLA que no mejor la capacidad de salto ($p>0,05$), CR mejoró el rendimiento con respecto al PRE (34,3 ± 4,5 cm) en MID (36,8 ± 3,79 cm; $t=-3,81$; $p=0,02$), y en POST vs MID (POST: 37,6 ± 5,4 cm; $t=-3,93$; $p=0,02$). Estos resultados muestran como la capacidad de salto puede estar asociada con la disminución del dolor, pero no con la fuerza máxima. Por tanto, CR puede ser considerada

como ayuda ergogénica en atletas con TR al permitir la transferencia de las ganancias de fuerza en movimientos funcionales presentes en los deportes, como por ejemplo el salto.

Keywords: Suplementos dietéticos; Ejercicio; Lesión; Nutrición; Deporte; Rendimiento

Influencia de los segmentos y las transiciones en el rendimiento de triatletas de élite según la distancia y el sexo

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Introdução/Introduccion

Comprender los factores que influyen en el rendimiento del triatlón de élite es crucial para desarrollar estrategias de entrenamiento y competición efectivas. Este estudio analizó cómo el rendimiento en los diferentes segmentos del triatlón afecta al resultado final de triatletas de élite en competiciones de corta distancia, teniendo en consideración el sexo, la distancia de la prueba y el nivel de rendimiento.

Métodos/Metodologia

Se analizaron los resultados de 113 Series Mundiales de Triatlón (2017–2024), que incluyeron 19 triatlones de distancia Súper Sprint, 36 Sprint y 58 Olímpica (n = 2004 mujeres y 2113 hombres). Los tiempos parciales se normalizaron a una escala de 0 a 100 para tener en cuenta las variaciones del lugar y de las condiciones ambientales, y se analizaron mediante modelos lineales generales y análisis de árboles de decisión.

Resultados e Conclusões/Resultados y Conclusiones

El rendimiento en la carrera a pie mostró las asociaciones más fuertes en todas las distancias, con valores β que oscilaron entre 0.13 y 0.39 en hombres, y entre 0.07 y 0.23 en mujeres, desde pruebas Super Sprint hasta Olímpicas, respectivamente. Los análisis mediante árboles de decisión atribuyeron entre el 39 % y el 67 % de la clasificación final a la carrera en los/as triatletas que finalizaron en el Top 10. Si bien la importancia del ciclismo aumenta con la distancia, este segmento sigue siendo menos decisivo que la natación en mujeres del Top 10 (9 %–21 % frente a 23 %–31 %). Las transiciones, especialmente la T1, tuvieron una influencia notable en la posición final en las pruebas Sprint y Super Sprint, en particular entre las mujeres (β = 0.13 y 0.07, respectivamente), pero su impacto fue mínimo en la distancia Olímpica. La T2 también contribuyó al rendimiento en la distancia Sprint en ambos sexos (β = 0.05). Nuestros hallazgos revelan que, a medida que aumenta la distancia de competición, el ciclismo y la carrera a pie adquieren mayor relevancia, siendo esta última el factor más determinante en ambos sexos. El rendimiento en la T1 es más influyente en triatletas femeninas, especialmente en distancias cortas, mientras que la natación tiene un impacto limitado en los resultados generales, salvo en el caso de las mujeres que terminan en el Top 10.

Keywords: Natación, Ciclismo, Carrera, Transiciones, Análisis de la Competición

Seguros ou perigosos? Avaliação dos suplementos esportivos do Grupo A no contexto da hipótese da barreira epitelial

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Introdução/Introduccion

A hipótese da barreira epitelial sugere que a integridade das barreiras epiteliais da pele, trato respiratório e mucosa intestinal contribui para várias doenças crônicas. Treinamentos de alta intensidade e longa duração, desidratação, má nutrição, entre outros, podem causar sensibilidade da barreira epitelial em atletas de elite. Estes atletas costumam consumir suplementos esportivos (SE) para melhorar o desempenho, apoiar a estética corporal e prevenir deficiências nutricionais. Evidências científicas indicam que os SE também podem influenciar a integridade das barreiras epiteliais. Este estudo tem como objetivo discutir os possíveis efeitos dos suplementos classificados como Grupo A pelo Instituto Australiano do Esporte (AIS) na integridade da barreira epitelial.

Métodos/Metodologia

Este estudo foca nos suplementos do Grupo A, respaldados por evidências científicas robustas para uso em contextos esportivos específicos, seguindo diretrizes baseadas em evidências. Neste contexto, são investigados os possíveis efeitos de alimentos esportivos, suplementos médicos e suplementos de desempenho sobre a integridade da barreira epitelial, imunidade tipo 2, inflamação, barreira mucosa e colonização por patógenos.

Resultados e Conclusões/Resultados y Conclusiones

Os efeitos dos SE sobre o sistema gastrointestinal podem variar bastante. Certos suplementos como zinco, vitamina D, probióticos, proteína, cálcio, beta-alanina, creatina e nitratos demonstraram reduzir a permeabilidade intestinal e a inflamação, ao mesmo tempo que aumentam a expressão das proteínas das junções estreitas. No entanto, o uso não supervisionado de bebidas energéticas, barras esportivas, géis, suplementos eletrolíticos e ferro pode provocar efeitos adversos à saúde devido a danos na barreira epitelial. Curiosamente, os estudos sobre o impacto da cafeína, glicerol e bicarbonato de sódio na integridade da barreira epitelial apresentam resultados contraditórios. Esses achados indicam que, embora os suplementos do Grupo A sejam geralmente considerados seguros, seus efeitos a longo prazo devem ser reavaliados, principalmente no que se refere à integridade epitelial. São necessárias mais pesquisas para esclarecer com que frequência

os suplementos influenciam essa barreira, especialmente em atletas de elite sob estresse físico elevado.

Keywords: barreira epitelial, inflamação, esportes, suplementos, junções estreitas.

Las bebidas deportivas pueden afectar los parámetros salivales en futbolistas adolescentes

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Introdução/Introduccion

Muchos adolescentes deportistas recurren a los suplementos deportivos (SD) para mejorar su rendimiento. Sin embargo, el uso creciente de estos productos plantea interrogantes sobre cómo podrían afectar la salud bucal a largo plazo. Aunque la mayoría de los estudios se centran en atletas adultos y vinculan el consumo de bebidas deportivas con problemas dentales como la erosión y las caries, vale la pena preguntarse si estos problemas podrían comenzar mucho antes, durante la adolescencia. Este estudio exploró cómo el uso de suplementos puede influir en las características salivales y en los primeros signos de cambios en la salud oral en futbolistas adolescentes.

Métodos/Metodologia

Las características de los participantes y el uso de suplementos deportivos se recopilaron de 52 futbolistas adolescentes mediante un cuestionario estructurado. La experiencia de caries dental se evaluó utilizando el índice DMFT (Caries, Ausencias y Obturaciones Dentales). La erosión dental se evaluó mediante dos herramientas clínicas: el Índice Visual de Examen de Erosión Dental y la Evaluación Básica del Desgaste Erosivo. Los parámetros salivales se midieron utilizando el kit GC Saliva Check Buffer. El análisis estadístico se realizó con el software Jamovi (Versión 1.8).

Resultados e Conclusões/Resultados y Conclusiones

No se encontró una relación significativa entre el uso regular de suplementos deportivos y el índice DMFT ni la erosión dental. Sin embargo, se identificó una asociación significativa únicamente entre el consumo de bebidas deportivas y el pH salival en reposo, el volumen salival estimulado (mL) y el pH salival estimulado ($p < 0.05$). Estos hallazgos sugieren que, entre los suplementos utilizados durante la adolescencia, las

bebidas deportivas representan el mayor riesgo en cuanto a parámetros salivales. El uso temprano y frecuente de bebidas deportivas podría tener consecuencias a largo plazo para la salud bucal. Concienciar a los atletas adolescentes es fundamental, y ofrecer alternativas de hidratación seguras, como el agua mineral, puede formar parte de esa estrategia.

Keywords: adolescente, fútbol, deportes, suplementos, salud bucal

Perfiles físicos y de rendimiento por posición de juego en jugadores juveniles de élite de fútbol sala

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Introdução/Introduccion

El conocimiento de los perfiles físicos y de rendimiento por posición en fútbol sala juvenil es clave para optimizar la preparación física, orientar la detección del talento y prevenir lesiones. A pesar de la alta exigencia del deporte, existen pocas investigaciones que analicen estas diferencias en deportistas jóvenes.

Métodos/Metodologia

Participaron 98 jugadores sub-19 de élite nacional (edad: 17.3 ± 0.78 años), distribuidos como porteros (n=15), cierres (n=22), alas izquierdas (n=16), alas derechas (n=27) y pívots (n=18). Se evaluaron estatura, masa corporal, salto vertical (CMJ), salto horizontal, sprints de 10 y 25 metros, y pruebas de cambio de dirección (COD 180° y test en V). Se aplicó ANOVA con comparaciones post-hoc ($p \leq 0.05$).

Resultados e Conclusões/Resultados y Conclusiones

Se observaron diferencias significativas entre las posiciones de juego. Los pívots (179.4 ± 5.40 cm) y los porteros (181.8 ± 6.08 cm) fueron significativamente más altos que los alas izquierda (173.7 ± 5.26 cm), alas derecha (174.5 ± 5.52 cm) y cierres (175.4 ± 5.74 cm) ($p<0.05$). La masa corporal también fue superior en porteros (78.3 ± 9.78 kg) y pívots (72.9 ± 3.97 kg) respecto al resto de posiciones. En cuanto al rendimiento, los porteros presentaron tiempos significativamente más lentos en el test COD hacia la izquierda (2.76 ± 0.11 s) en comparación con todas las demás posiciones ($p<0.05$; tamaño del efecto = 1.32 a 1.89). Asimismo, las alas izquierda mostraron mejor rendimiento en el test en V (6.94 ± 0.17 s) que los porteros (7.17 ± 0.19 s). No se encontraron diferencias significativas entre los jugadores de campo (alas, cierres, pívots) en los saltos ni en los sprints lineales. Los pívots y porteros presentan perfiles físicos distintos, con mayor estatura y peso corporal, pero menor rendimiento en agilidad y velocidad de desplazamiento. Las posiciones de campo muestran características físicas y de rendimiento similares, lo que puede deberse a cargas de entrenamiento homogéneas en esta etapa. Estos resultados permiten a los entrenadores adaptar los programas de preparación según las demandas específicas del puesto.

Keywords: fútbol sala, perfiles de jugador, atletas jóvenes, rendimiento físico, antropometría, posiciones de juego.

Impacto del volumen de entrenamiento de fuerza en el déficit de fuerza

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Introdução/Introduccion

El déficit de fuerza representa la diferencia relativa entre la fuerza producida contra el «máximo de una repetición» (es decir, 1RM) y cualquier otra carga de menor magnitud (por ejemplo, 10-95% 1RM). La forma más práctica de abordar la cuantificación de este déficit es midiendo la velocidad a la que se levantan las cargas absolutas en una prueba progresiva. Una vez conocido el valor de 1RM, las cargas absolutas se convierten en cargas relativas (%1RM). Si las velocidades en cada %1RM tienden a aumentar, el déficit de fuerza ha disminuido; por el contrario, si la velocidad disminuye, el déficit ha aumentado. Una reducción del déficit de fuerza significa que el atleta es capaz de aplicar una fuerza mayor (en relación con su capacidad máxima) a un %1RM determinado. Por lo tanto, el objetivo del presente estudio era analizar el efecto del volumen de entrenamiento de resistencia sobre el déficit de fuerza.

Métodos/Metodologia

Treinta y seis hombres entrenados en fuerza fueron distribuidos aleatoriamente en tres grupos: volumen bajo (LOW), moderado (MOD) y alto (HIG). Todos los grupos entrenaron sentadilla completa dos veces por semana, con intensidades relativas que aumentaron del 70% al 85% de 1RM durante un periodo de entrenamiento de 8 semanas. LOW realizó sólo 3 repeticiones por sesión; MOD completó 12, 10, 8 y 6 repeticiones por sesión con 70%, 75%, 80% y 85% 1RM, respectivamente; y HIG realizó 24, 21, 18 y 15 repeticiones por sesión con 70%, 75%, 80% y 85% 1RM, respectivamente. Cada sesión consistió en una sola serie con periodos de descanso de 10 segundos entre repeticiones para minimizar la acumulación de fatiga durante la sesión de entrenamiento. Si la diferencia de VMP entre la repetición más rápida y las siguientes estaba entre 0.04-0.06 m-s-1, el periodo de descanso entre repeticiones se prolongaba a 20 segundos. Si la diferencia estaba entre 0.07-0.09 m-s-1, se añadían 10 segundos más de descanso entre

repeticiones, y así sucesivamente. Esto se hizo para aislar el efecto de la variable independiente, es decir, el volumen de entrenamiento.

Resultados e Conclusões/Resultados y Conclusiones

Se observó una interacción significativa «grupo x tiempo» para cada %1RM ($p < 0.01$), excepto para 95-100% 1RM, junto con un efecto temporal significativo para todos los valores de %1RM excepto para 85-100% 1RM. El grupo MOD logró incrementos estadísticamente mayores que el grupo LOW del 10% al 80% 1RM ($p < 0.001$-0.05). Por lo tanto, un volumen de entrenamiento moderado produjo una reducción del déficit de fuerza.

Keywords: Velocidad de levantamiento; Carga de entrenamiento; Gestión de la fatiga; Entrenamiento basado en la velocidad

Un tendón de Aquiles y una fascia plantar más grandes inducen un factor de trabajo menor durante barefoot running

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Introdução/Introduccion

Los tendones desempeñan un papel crucial al permitir el almacenamiento y la liberación de energía mecánica durante el ciclo de carrera. La cinemática de carrera, incluido el duty factor, constituye un elemento fundamental de la biomecánica del corredor y puede determinar su rendimiento. Este estudio tuvo como objetivo analizar la relación entre la morfología del tendón de Aquiles y la fascia plantar y los parámetros de carrera, considerando la influencia de usar zapatillas en comparación con correr descalzo.

Métodos/Metodologia

44 participantes (30 hombres y 14 mujeres) participaron en dos sesiones de carrera, una con zapatillas y otra sin ellas, ambas de 3 minutos de duración a una velocidad constante de 12 km/h. Se registraron datos cinemáticos de la carrera mediante un sistema de células fotoeléctricas durante las sesiones. Antes de las pruebas, se midió el grosor y el área transversal del tendón de Aquiles y la fascia plantar mediante ecografía

Resultados e Conclusões/Resultados y Conclusiones

La prueba de Pearson reveló una correlación significativa ($p < 0,05$) entre la morfología del tendón de Aquiles y la fascia plantar y el duty factor ($r > -0,325$), el tiempo de vuelo ($r > -0,325$) y el duty factor ($r > -0,328$) durante la carrera descalza. En la condición de carrera con calzado, no se encontró correlación significativa entre la morfología del tejido conectivo y las variables cinemáticas. Conclusiones: En la carrera descalza, un mayor tamaño del tendón de Aquiles y la fascia plantar resulta en un menor duty factor, atribuido a mayores tiempos de vuelo y menores tiempos de contacto.

Keywords: Descalzo, Cinemática, Correr, Tendones

Evaluación del entrenamiento de la musculatura inspiratoria en pacientes con Esclerosis Múltiple. Una revisión sistemática

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Introdução/Introduccion

La esclerosis múltiple (EM) es una enfermedad autoinmune, degenerativa, caracterizada por lesiones desmielinizantes en el sistema nervioso central. La EM puede afectar a la musculatura respiratoria ocasionando acúmulos de secreciones, insuficiencia respiratoria y finalmente la muerte. Se ha propuesto que el entrenamiento de la musculatura inspiratoria (IMT), especialmente mediante dispositivos Threshold, podría aliviar los síntomas respiratorios de la EM. El objetivo del estudio fue analizar la evidencia disponible sobre la efectividad del IMT con Threshold en pacientes con EM.

Métodos/Metodologia

Siguiendo las recomendaciones Prefered Reporting Items for Systematic Review and Meta-Analysis (PRISMA) se revisaron sistemáticamente los estudios indexados en las bases de datos PubMed, PEDro, Cochrane y Scopus. Se seleccionaron los ensayos clínicos aleatorizados y estudios pre-post que incluyeran pacientes con EM y su grupo intervención realizara IMT mediante Threshold exclusivo o en combinación con ejercicio físico. Se emplearon la escala PEDro y la herramienta de Cochrane para analizar la calidad metodológica y el riesgo de sesgo respectivamente.

Resultados e Conclusões/Resultados y Conclusiones

Se seleccionaron 2 ensayos clínicos aleatorizados y 4 estudios pre-post incluyéndose 257 pacientes. La mayoría de los estudios han demostrado efectos beneficiosos del IMT, sin efectos adversos. Se han reportado mejoras estadísticamente significativas ($p<0,05$) en las presiones respiratorias, parámetros ergoespirométricos, disnea, equilibrio y capacidad aeróbica tras realizar IMT aislado o en combinación con ejercicio físico. Sin embargo, solo se han observado mejores resultados respecto al grupo control en la presión inspiratoria máxima. Por el contrario, no se han observado efectos beneficiosos del IMT en la fatiga, fuerza de las extremidades inferiores y calidad de vida. En conclusión, el IMT mediante Threshold aumenta las presiones respiratorias máximas y parámetros ergoespirométricos en pacientes con EM. Además, su combinación con ejercicio físico

mejora la sensación de disnea, el equilibrio y la capacidad aeróbica, aunque no se han encontrado beneficios en la fatiga, fuerza y calidad de vida.

Keywords: Esclerosis múltiple, Entrenamiento de la musculatura inspiratoria, Threshold, Presión inspiratoria máxima

Entrenamiento de la musculatura respiratoria en pacientes con enfermedad pulmonar obstructiva crónica: Una revisión sistemática

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Introdução/Introduccion

La enfermedad pulmonar obstructiva crónica (EPOC) se caracteriza por una obstrucción persistente al flujo aéreo consecuencia de una inflamación crónica. Es la tercera causa de muerte en el mundo. Los pacientes con EPOC presentan tos crónica, aumento de secreciones, disnea y debilidad de la musculatura respiratoria disminuyendo su calidad de vida. Se ha planteado que el entrenamiento de la musculatura inspiratoria (IMT) podría mejorar la sintomatología y calidad de vida de los pacientes con EPOC. El objetivo del estudio fue analizar la evidencia disponible sobre la eficacia del IMT en pacientes con EPOC.

Métodos/Metodologia

Siguiendo las recomendaciones Prefered Reporting Ítems for Systematic Review and Meta-Analysis (PRISMA) se revisaron sistemáticamente los estudios indexados en las bases de datos PubMed, PEDro y Cochrane. Se seleccionaron los ensayos clínicos aleatorizados publicados en los últimos 10 años, que incluyeran pacientes con EPOC y el grupo intervención realizara IMT. Se emplearon la escala PEDro y la herramienta de Cochrane para analizar la calidad metodológica y el riesgo de sesgo respectivamente.

Resultados e Conclusões/Resultados y Conclusiones

Se incluyeron 7 ensayos clínicos aleatorizados que realizaron IMT con los dispositivos PowerBreath, Threshold y Pro2 Fit. Se han reportado mejoras estadísticamente significativas ($p<0,05$) de la presión inspiratoria máxima (PIM), disnea, capacidad aeróbica, equilibrio y calidad de vida al terminar el IMT. Sin embargo, solo se han observado aumentos significativos ($p<0,05$) respecto al grupo control en la PIM y el equilibrio. No se han reportado diferencias entre los dispositivos ni efectos adversos. En conclusión, el IMT mejora la PIM, la disnea, la capacidad aeróbica, el equilibrio y la calidad de vida en pacientes con EPOC, independientemente del dispositivo empleado.

Keywords: Enfermedad pulmonar obstructiva crónica, Entrenamiento de la musculatura inspiratoria, Presión inspiratoria máxima, disnea.

EFEITOS DO TREINAMENTO RESISTIDO SOBRE AS MANIFESTAÇÕES DE FORÇA EM HOMENS UNIVERSITÁRIOS

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Introdução/Introduccion

A força muscular (FM) é uma capacidade física que se manifesta de três formas diferentes: força dinâmica, força isométrica e força explosiva. Embora, cada uma com suas particularidades, a FM está relacionada a funcionalidade do corpo humano e o desempenho esportivo, portanto, torna-se importante entender como essa capacidade física pode ser desenvolvida. Neste sentido, os ganhos de força podem ser adquiridos através do treinamento resistido (TR) que gera adaptações neuromusculares (adaptações que acontecem na comunicação entre o sistema nervoso e muscular) e hipertróficas, sendo nas semanas iniciais as adaptações neuromusculares são predominantes. Os objetivos foram avaliar e comparar os efeitos dos treinamentos resistidos (treinamento resistido tradicional [TRT] e treinamento resistido com volantes inerciais [TRVI]) sobre as manifestações de força em homens universitários.

Métodos/Metodologia

Doze homens (22,1 ± 2,7anos; 175,8 ± 4,8 cm; 67,4 ± 8,8 kg), praticantes de atividade física, e não envolvidos com TR durante os últimos 3 meses foram incluídos neste estudo. Os testes foram realizados no exercício de flexão de cotovelos e avaliaram: a força nos testes de contração isométrica voluntária máxima (CVIM), força dinâmica máxima (1RM) e potência a 60% do 1RM, antes e depois de 4 semanas de TRT (n=6) ou TRVI (n=6). Os dados foram analisados pelo teste ANOVA two way.

Resultados e Conclusões/Resultados y Conclusiones

Houve aumento nas manifestações de força, sendo elas, força dinâmica (<0,001), potência pico (0,032) e potência média (0,032), não havendo diferenças significativas entre os grupos. A conclusão é que ambos, TRT e TRVI, tiveram influência nos níveis de FM, corroborando a literatura que diz que o TR é uma forma de desenvolver a FM.

Keywords: Treinamento Resistido, Exercício Físico, Força Muscular.

Entrenamiento en maquinaria biosaludable. Protocolo y progresión para personas adultas y mayores.

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Introdução/Introduccion

La edad media poblacional se encuentra en aumento. Se calcula que para el 2040, el 19.2% de la población mundial será mayor de 60 años. A este grupo poblacional se le asocian múltiples enfermedades relacionadas con el envejecimiento como enfermedades cardiovasculares, respiratorias, osteoporosis, diabetes, cáncer, deterioro cognitivo y demencia. Es por ello que múltiples entidades públicas han optado por diferentes métodos de promoción del estilo de vida activo entre los mayores, encontrándose entre las múltiples opciones la instalación de parques biosaludables. Estas instalaciones constan de estructuras metálicas similares a las máquinas fitness tradicionales, pero adaptadas para así poder ser ubicadas en exteriores. Son encontradas comúnmente en parques y espacios públicos, de acceso gratuito, y con una mecánica simple que facilita su uso. Aunque están especialmente destinadas para la población mayor son de uso libre por lo que cualquier persona tiene acceso a ellas. Estas, funcionan mediante un juego de palancas el cual es lastrado con el propio peso corporal del usuario que la utiliza. A pesar de su gran popularidad, numerosas investigaciones defienden su ineficacia, por el contrario, hay aspectos poco detallados los cuales no han sido tenidos en cuenta a la hora de diseñar las diferentes intervenciones. Por este motivo, el objetivo del presente trabajo es la presentación de un protocolo de entrenamiento, el cual además permite un aumento de la carga de entrenamiento en maquinaria biosaludable.

Métodos/Metodologia

Para ello se confeccionó una planificación de 8 semanas de entrenamiento de fuerza en circuito utilizando únicamente maquinaria biosaludable. El entrenamiento consistió en 11 ejercicios. Estos fueron realizados en 8 modelos de máquinas biosaludables diferentes (Jinete, Paseo, Surf, Remo, Barras paralelas, Gemini, Volantes y Columpio) de la compañía Entorno Urbano S.L.U (Murcia, España). Respecto al entrenamiento, todos los

sujetos deben ser previamente familiarizados con la técnica de ejecución de cada una de las máquinas. Durante las sesiones, la velocidad de ejecución será controlada mediante un metrónomo digital.

Resultados e Conclusões/Resultados y Conclusiones

El resultado del presente trabajo muestra una planificación de 8 semanas de entrenamiento en circuito mediante maquinaria biosaludable. Respecto a las series, se realizará 1 serie durante las sesiones de la primera semana, 2 series en la segunda semana y 3 series en las sesiones restantes hasta la octava semana. En cuanto al tiempo de trabajo por ejercicio será de 30 segundos las 4 primeras semanas y de 45 segundos las 4 últimas. El número de repeticiones por serie será de 15 a excepción de las 2 últimas en las cuales serán 11. En la fase de ejecución concéntrica excéntrica controlada mediante metrónomo, las cuatro primeras semanas se realizará a un ritmo de 1/1, las semanas 5 y 6 será a un ritmo de 1/2 y las dos últimas semanas serán a un ritmo de 2/2. Por último, los tiempos de descanso serán de 30 segundos entre ejercicios a excepción de la primera semana en la cual será de 45 segundos, y de 4 minutos entre series a excepción de la semana dos en la cual serán 2 minutos. Esta propuesta ya ha sido previamente utilizada, obteniendo resultados positivos, por lo que el presente protocolo puede ser una gran herramienta de trabajo para mejorar la salud de la población mayor.

Keywords: Entrenamiento, envejecimiento, fuerza, gimnasio al aire libre, maquinaria guiada de entrenamiento.

Evolución del Perfil de Potencia ciclista y de la Carga Externa de Entrenamiento en Triatletas Internacionales Júnior y Sub23: un Análisis Longitudinal entre temporadas.

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Introdução/Introduccion

El perfil de potencia se ha establecido como una herramienta fiable para controlar el rendimiento en el segmento ciclista del triatlón. Sin embargo, aún no está claro cómo influye la carga de entrenamiento en el perfil de potencia. El objetivo de este estudio fue analizar la evolución de la potencia máxima media (PMM) en triatletas internacionales y examinar su relación con las características del entrenamiento basadas en la carga externa.

Métodos/Metodologia

Se analizaron longitudinalmente los datos de entrenamiento y competición ciclista de 7 triatletas masculinos y 7 femeninos junior y sub23 durante 3 temporadas consecutivas. Se registró el MMP del perfil de potencia, junto con el volumen de entrenamiento acumulado en cada banda de potencia de 2,0 W·kg-1. Se realizó un análisis correlacional entre los valores de MMP y el volumen de entrenamiento acumulado en cada banda de potencia.

Resultados e Conclusões/Resultados y Conclusiones

Todos los valores de MMP, excepto los valores de 10 s, 30 s y 5 min, aumentaron ($p<0,05$) a lo largo de las tres temporadas (Δ = 0,9% a 4,8%), así como el tiempo total (Δ = 22,1%) y la distancia total (Δ = 32,8%). En concreto, el porcentaje de tiempo en la banda de potencia de 4-6 W·kg-1 (Δ = 1,2%) y el rendimiento MMP- 1 a 20 min (Δ = 3,3% a 10,0%) aumentaron ($p<0,05$) de 2 a 3 Temporada. Los valores de MMP de duración ≤ 30 s mostraron una correlación muy grande con el porcentaje de tiempo pasado en bandas de potencia de 12-14 W·kg-1. Todos los valores de MMP mostraron una correlación moderada negativa con el porcentaje de tiempo pasado en la banda de potencia de 0-2 W·kg-1. Las mejoras en casi todos los valores del perfil de potencia a lo largo de las temporadas consecutivas estuvieron relacionadas con el aumento del volumen total de entrenamiento y el tiempo dedicado a las bandas de potencia de intensidad moderada.

Keywords: perfil de potencia, ciclismo, rendimiento, monitorización.

Aumento da capacidade aeróbia em jovens jogadores de futebol: impacto do treino combinado de jogos intermitentes, intervalados e de pequena dimensão num microciclo periodizado 3:1

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Introdução/Introduccion

O futebol é um desporto de invasão de alta intensidade, baseado em equipas, caracterizado por movimentos esporádicos, multidirecionais e imprevisíveis 12. A otimização das estratégias de treino para satisfazer estas exigências é fundamental para melhorar o desempenho do jogador 1,11. Um componente essencial do design eficaz do treino é a gestão da carga de treino 6, que é dividida em carga externa (trabalho físico realizado) e carga interna (resposta fisiológica). Independentemente das características internas, o trabalho realizado durante o treino ou competição é designado por carga externa 7. O sistema energético aeróbico desempenha um papel fundamental no desempenho futebolístico, uma vez que os jogadores exigem uma elevada resistência para sustentar esforços repetidos de alta intensidade ao longo de um jogo. Um dos métodos mais comuns utilizados para melhorar a capacidade aeróbica, particularmente o consumo máximo de oxigénio (VO2máx), é o treino intervalado 4. O treino intervalado é um dos métodos mais comuns utilizados para aumentar o VO2máx dos jogadores de futebol. A alteração da velocidade da corrida é o ponto principal deste método, que pode ser realizado em vários modelos 18. Nos últimos anos, o treino intermitente tem ganho atenção pela sua validade ecológica e simulação próxima das condições da partida. Este tipo de treino aeróbico pode não ter tanto impacto como o treino intervalado, mas cria uma situação semelhante à de uma partida real para os jogadores. Isto significa que os jogadores não precisam de correr continuamente a uma velocidade constante ou variável; devem correr e depois andar ou parar completamente. Assim sendo, o treino intermitente é dividido em corrida e descanso 16. Além disso, os jogos reduzidos (SSGs) tornaram-se uma ferramenta de treino popular devido aos seus benefícios técnicos, táticos e fisiológicos 8. Cada um destes modelos de treino é necessário no programa de treino de jogadores de futebol, e o planeamento e organização deliberados de um programa de treino que requer um sequenciamento lógico e sistemático de várias variáveis de treino (por exemplo, intensidade, volume, frequência, período de recuperação e exercícios) de forma integrativa para otimizar os resultados de desempenho em pontos de tempo pré-

determinados são conhecidos como periodização. A periodização deve priorizar o desenvolvimento dos atletas e a prevenção de lesões, para além do desempenho 9. Este processo apresenta a oportunidade de uma abordagem sistemática e estruturada a todo o treino em termos de muitas unidades estruturais essenciais, especificamente as sessões de treino que servem como unidade central e os microciclos, mesociclos e macrociclos 3. Dentro desta estrutura, o microciclo, que normalmente abrange uma semana de treino, é a unidade fundamental que pode ser adaptada com base nos horários das partidas, na saúde dos jogadores, na fadiga e nas condições ambientais. Assim, com base nos parâmetros referidos, este estudo tem como objetivo: (i) Investigar os efeitos da combinação de treino intervalado, treino intermitente e SSG dentro de um microciclo estruturado na capacidade aeróbia de jovens jogadores de futebol. (ii) Comparar as melhorias no VO2máx entre os jogadores centrais e laterais em cada escalão etário em separado. (iii) Avaliar a progressão da capacidade aeróbia de jovens futebolistas submetidos ao mesmo microciclo de treino em dois grupos etários diferentes (Sub-16 e Sub-19). Assim, colocamos a hipótese de que (1) o modelo de treino integrado aumentará significativamente o VO2máx em jovens jogadores de futebol, (2) os jogadores laterais experimentarão maiores melhorias no VO2máx em comparação com os jogadores centrais e (3) os jogadores sub-19 mostrarão maiores melhorias no VO2máx do que os jogadores sub-16 devido às adaptações fisiológicas relacionadas com a idade e às respostas de treino.

Métodos/Metodologia

Participaram no estudo 30 jogadores de futebol semiprofissionais do sexo masculino, abrangendo duas faixas etárias: Sub-16 (n = 13, idade média = 15,8 ± 0,4 anos) e Sub-19 (n = 17, idade média = 18,2 ± 0,3 anos), permitindo uma análise comparativa entre os estádios maturacionais (Figura 1). Critérios de inclusão rigorosos, incluindo a participação ativa em treinos e competições de futebol semiprofissionais e a ausência de lesões recentes significativas, garantiram uma linha de base homogénea. Os critérios de exclusão incluíram: (i) incapacidade de completar três sessões de treino consecutivas e (ii) lesões ocorridas durante o período do estudo que impediram a participação plena. Durante a intervenção de 16 semanas, dois jogadores desistiram devido a lesões, e um jogador saiu por motivos pessoais. Os dados destes participantes foram excluídos da análise final. Todos os participantes (ou os seus tutores legais, para menores) forneceram consentimento informado por escrito após terem sido totalmente informados sobre os procedimentos, benefícios e riscos potenciais do estudo. O protocolo recebeu aprovação ética do Comité de Ética da Universidade de Tor Vergata (código de aprovação: 11/2024) e aderiu às diretrizes da Declaração de Helsínquia para a investigação humana.

Resultados e Conclusões/Resultados y Conclusiones

Uma ANOVA unidirecional revelou uma diferença estatisticamente significativa na melhoria do VO2máx entre os grupos U16 e U19, $F(1, 28) = 5,47$, $p = 0,027$, $\eta^2 = 0,07$. O grupo U19 demonstrou uma melhoria significativamente maior (M = 29,49, DP = 12,39) em comparação com o grupo U16 (M = 22,35, DP = 10,27), indicando que a idade

teve um efeito significativo na resposta ao treino. Relativamente à análise de correlação, os jogadores centrais de ambos os grupos apresentaram relações fracas entre o VO2máx pré e pós-teste (r = 0,21 para U16, r = 0,17 para U19). Em contraste, os jogadores laterais apresentaram fortes correlações (r = 0,78 para U16, r = 0,94 para U19). A correlação global entre o VO2máx pré e pós foi moderada nos Sub-16 (r = 0,65), mas forte nos Sub-19 (r = 0,73), sugerindo que os jogadores laterais apresentaram melhorias mais consistentes em ambos os grupos. A análise de interação Grupo × Fator não mostrou efeitos de interação estatisticamente significativos (p = 0,192 para U16, p = 0,229 para U19), mas um efeito de nível de tendência (p = 0,065) sugere que a idade e a adaptação ao treino ainda podem influenciar as taxas de melhoria. As comparações do tamanho do efeito destacaram ainda mais o impacto da idade na eficácia do treino. O grupo U19 apresentou um maior tamanho de efeito (η^2 = 0,83) em comparação com o U16 (η^2 = 0,76), reforçando que os jogadores mais velhos responderam de forma mais eficiente às intervenções de treino. Estas questões mostram os tamanhos de efeito específicos do grupo relacionados com as alterações do VO2máx. Os insights do gráfico de comparação confirmam que os jogadores Sub-19 tiveram um VO2máx pré-teste mais elevado e maiores melhorias pós-teste, enquanto os jogadores Sub-16 melhoraram a uma taxa mais baixa (Figura 7). Discussão De acordo com os resultados do estudo atual, foi observada uma melhoria significativa do VO2máx após a implementação combinada de treino intermitente, intervalado e de jogo reduzido (SSG). Esta melhoria foi mais acentuada no grupo U19, cujos membros já tinham passado pela puberdade, em comparação com o grupo U16, que ainda estava a sofrer um desenvolvimento maturacional. Além disso, os jogadores que ocupam posições laterais demonstraram maiores melhorias aeróbias em comparação com os das funções centrais, sugerindo que as exigências posicionais podem influenciar a capacidade de resposta do treino. O grupo Sub-19 apresentou a correlação mais forte entre o treino e a melhoria do VO2máx, reforçando a ideia de que os atletas adolescentes mais velhos podem beneficiar mais do condicionamento aeróbio devido à maturidade fisiológica avançada. Estas descobertas são consistentes com Gaurav et al 5 que observaram melhorias no VO2máx em jogadores de futebol sub-19 após intervenções de treino intervalado. . No entanto, resultados contrários foram reportados por Nilsson e Cardinale 14, que não encontraram qualquer diferença significativa nos resultados do VO2máx com base nas posições dos jogadores. O grupo U16 também demonstrou melhorias significativas no VO2máx, consistentes com as descobertas de Kabdwal et al. 8 que reportaram ganhos aeróbicos significativos em jogadores sub-16 após uma combinação de treino intervalado e de força explosiva. Da mesma forma, Los Arcos et al. 10 mostraram que o treino intermitente curto produziu melhorias superiores no VO2máx em comparação com jogos de pequena dimensão ou treino genérico em jogadores jovens com uma idade média de 16,8 ± 3,1 anos. O segundo objetivo deste estudo foi examinar as diferenças de VO2máx entre jogadores centrais e laterais. Os resultados indicaram que os jogadores laterais apresentaram melhorias significativamente maiores do que os jogadores centrais em ambas as faixas etárias. Estas descobertas são apoiadas por Barrera et al. 2, que observaram tendências semelhantes entre as jogadoras de futebol, notando-se particularmente maiores ganhos aeróbios nas jogadoras de posições abertas em comparação com as defensoras centrai

Keywords: Microciclo, Jogos de Pequena Dimensão, VO2máx, Condicionamento Aeróbio, Diferenças Posicionais

Explorando o impacto da reabilitação funcional através do exercício nas alterações de biomarcadores neuroplásticos em doenças cardiovasculares

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Introdução/Introduccion

No campo da saúde, a complexa interação entre a neuroplasticidade, a saúde cardiovascular e a reabilitação funcional através do exercício tem atraído cada vez mais atenção. À medida que investigadores e clínicos se aprofundam na compreensão destas ligações, torna-se evidente que uma abordagem narrativa pode elucidar as relações multifacetadas entre estes domínios. Nesta revisão narrativa, embarcamos numa viagem pelo panorama científico, explorando como diferentes tipos de intervenções de exercício influenciam as alterações nos biomarcadores neuroplasticidade no sistema cardiovascular. Vários estudos demonstraram que a aprendizagem de novas tarefas desencadeia a plasticidade cerebral, levando a modificações estruturais e à melhoria da função cognitiva, sublinhando ainda mais a complexa relação entre a neuroplasticidade e a saúde cardiovascular. A atividade física, incluindo o treino aeróbico e de resistência, surgiu como um fator modificável na promoção da saúde cardiovascular e cerebral. Foi demonstrado que as intervenções de exercício melhoram a neuroplasticidade e a função cognitiva, oferecendo potenciais benefícios terapêuticos para indivíduos com perturbações cardiovasculares. A atividade física é capaz de induzir a expressão do BDNF e as suas performances sinápticas, na reparação e reorganização de circuitos através da plasticidade em processos homeostáticos que ocorrem mais no envelhecimento. A influência da atividade física nas funções imunitárias do organismo tem sido fundamental na ciência do movimento e observa-se que os exercícios aeróbicos levam à redução da interlucina 6, interlucina 8 e fator de necrose tumoral (TNF) no processo de inflamação. Os exercícios aeróbicos, em particular, têm sido associados ao aumento dos níveis de BDNF, o que pode contribuir para melhorar a estrutura e função do cérebro. Foi originalmente indicado que a aptidão física e a função cerebral estão correlacionadas quando foi demonstrado que os atletas mais velhos tinham tempos de reação mais rápidos numa variedade de testes cognitivos do que os controlos inativos da mesma idade. Está demonstrado que são necessárias alterações qualitativas (aprendizagem de uma nova tarefa) para que o cérebro modifique a sua estrutura, desencadeando alterações plásticas logo após o início do treino. Dependendo da direção, aceleração e força do movimento no espaço para aceder ou avançar, os neurónios corticais disparam a taxas variadas. Estes

neurónios podem indicar vários movimentos em resposta a mudanças de estímulos e práticas. Os níveis corticais e espinhais de feedback sensorial, como a proprioceção, têm um impacto significativo na capacidade motora através da alteração da coordenação sensório-motora. Além disso, o treino de equilíbrio e força demonstrou melhorar a espessura cortical e o volume da substância cinzenta, destacando os benefícios multifacetados do exercício na neuroplasticidade e nos resultados cardiovasculares. A força, a potência, a corrida e outras capacidades funcionais são melhoradas por melhorias no equilíbrio e na propriocepção, que também são benéficas para a estabilidade. Exercícios de maior instabilidade combinados com treino de coordenação devem estimular alterações no controlo motor. Além disso, a dança foi considerada e demonstrou ter um GMD mais elevado do que aqueles que participam no treino de repetição e força. Além disso, a quantidade de BDNF no grupo de dança começou a crescer.

Métodos/Metodologia

Como revisão narrativa, os resultados foram recolhidos através do PubMed, Google Scholar, Research Gate e Web of Science. As palavras-chave nas pesquisas foram reabilitação funcional, reabilitação pelo exercício, biomarcador de neuroplasticidade e perturbações cardiovasculares. Todos os estudos selecionados foram publicados em inglês e todos estavam relacionados com o processo de prevenção de lesões nos doentes. Em alguma fase, os argumentos foram considerados separadamente e as suas interações entre si foram consideradas através de estudos combinados, o que é claramente mostrado na Tabela 1. Tabela 1: consideração das diferentes fases dos estudos 1 Biomarcador de neuroplasticidade VS Doença cardiovascular 2 Reabilitação VS Doença cardiovascular 3 Reabilitação VS Biomarcador de neuroplasticidade

Resultados e Conclusões/Resultados y Conclusiones

Concluindo, esta viagem narrativa lançou luz sobre a complexa relação entre a reabilitação funcional através do exercício, a neuroplasticidade e a saúde cardiovascular. O efeito dos exercícios funcionais influencia a neuroplasticidade e a substância cinzenta, que desempenham um papel fundamental na função do sistema nervoso autónomo para atingir o impacto no sistema cardiovascular através do controlo da hipertensão. Ao adotar uma abordagem holística e tirar partido de diversas modalidades de reabilitação, os médicos podem otimizar os resultados para os doentes com perturbações cardiovasculares. À medida que continuamos a desvendar as complexidades desta relação, a integração de intervenções baseadas na evidência na prática clínica é a chave para a promoção da saúde e do bem-estar ao longo da vida.

Keywords: biomarcadores de neuroplasticidade - perturbações cardiovasculares - reabilitação funcional pelo exercício

Efecto del entrenamiento de fuerza en el gasto metabólico en reposo en adultos jóvenes y adultos mayores. Estudio piloto

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Introdução/Introduccion

El gasto energético en reposo (RMR) es la cantidad de energía que el cuerpo utiliza para mantener sus funciones vitales mientras está despierto y en reposo. Representa la mayor parte del gasto energético diario y es clave para evaluar el estado metabólico, lo que puede ayudar en la prevención y tratamiento de enfermedades. Sin embargo, existen pocas evidencias que hayan analizado el efecto del entrenamiento sobre el RMR. Por ello, el objetivo principal de este estudio fue analizar el efecto de un programa de entrenamiento de fuerza basado en la velocidad sobre el RMR utilizando diferentes protocolos (20min vs 30 min) en función de la edad (adultos jóvenes vs adultos mayores).

Métodos/Metodologia

Se llevó a cabo un estudio experimental aleatorizado y controlado con 12 participantes divididos en dos grupos etarios (6 adultos mayores y 6 adultos jóvenes), midiendo el RMR mediante calorimetría indirecta antes y después de un programa de entrenamiento de 8 semanas de duración basado en la pérdida de velocidad (20%) realizando 4 series de los ejercicios de press de banca y sentadilla con cargas progresivas del 65% al 80%1RM. Antes y después del entrenamiento también se recogieron los hábitos dietéticos y la composición corporal.

Resultados e Conclusões/Resultados y Conclusiones

El entrenamiento de fuerza produjo un aumento del RMR (ANOVA, P = 0,006, np2 = 0,549), no observándose un efecto entrenamiento x edad o entrenamiento x protocolo (P > 0,291, np2 > 0,11). El incremento en el RMR fue similar en adultos jóvenes (16,7%, 1888,16 +- 236,3 vs 2267,1 +- 509,9 kcal, P = 0,030) como en adultos mayores (13,8%, 1689,3 +- 279,6 vs 1961 +- 272,5 kcal, P = 0.036). También se observó un incremento de las kcal ingeridas (P < 0,001, np2 = 0,72) sin diferencias entre grupos de edad (P = 0,553, np2 = 0,03), aumentado las kcal ingeridas un 21,1% en adultos jóvenes (1691 +- 357 vs 2144 +- 575 kcal, P = 0.002) y un 17,2% en adultos mayores (1707 +- 552 vs 2063 +- 656 kcal, P = 0.010). La composición corporal reveló una disminución de 1-2% de la masa libre de grasa que solo fue significativa en grupo de adultos mayores (P=0.008). En conclusión, ocho semanas de entrenamiento de fuerza basado en la velocidad produce un aumento del RMR tanto en adultos jóvenes como en adultos mayores. Este incremento en el RMR se acompañó con una respuesta compensatoria en la ingesta energética, pero fue independiente de la masa libre de grasa, lo que sugiere una mayor actividad metabólica en este tejido independientemente del volumen del mismo.

Keywords: metabolismo basal, metabolismo energético, fuerza muscular, edad

Impacto de un programa de ejercicio de rehabilitación acuática de fisioterapia en pacientes activos tras la reconstrucción quirúrgica del ligamento cruzado anterior. Una revisión sistemática de ensayos clínicos controlados.

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Introdução/Introduccion

La rotura del ligamento cruzado anterior es una lesión en aumento el mundo del deporte. Por este motivo, ha aumentado la necesidad de su rehabilitación que ha impulsado el desarrollo y la aplicación de diversas terapias para su rehabilitación. En este sentido, la rehabilitación en medio acuático, que por las propiedades intrínsecas del agua ofrece un enfoque de rehabilitación diferente al tradicional, utilizando la flotabilidad, la resistencia y la temperatura para mejorar la movilidad, incrementar la estabilidad, reducir el dolor, promover la recuperación. El objetivo fue comparar la eficacia de un programa de ejercicios de rehabilitación acuática respecto a la rehabilitación convencional mediante parámetros de fuerza, estabilidad, movilidad, función y dolor en adultos físicamente activos postcirugía de ligamento cruzado anterior.

Métodos/Metodologia

Siguiendo las pautas metodológicas de los Elementos de Información Preferred Reporting Itenms for Systematic Review and Meta-Analyses (PRISMA), se revisaron los estudios originales disponibles en cuatro bases de datos (Medline (PubMed), Physiotherapy Evidence Datebase (PEDro), Biblioteca Cochrane y Semantic Escolar) que evaluaran parámetros de fuerza, estabilidad, movilidad, función y dolor de los pacientes tras la cirugía del ligamento cruzado anterior. Se utilizaron la escala PEDro y el formulario de revisión crítica McMaster University Occupational Teraphy Evidence-Based Practice Research Group para evaluar la calidad metodológica. De los 71 estudios identificados en la búsqueda, solo 9 artículos cumplieron con los criterios de inclusión y fueron seleccionados para realizar la revisión sistemática. La calidad metodológica de los estudios seleccionados fue categorizada como “buena” o “muy buena”.

Resultados e Conclusões/Resultados y Conclusiones

La rehabilitación en medio acuático ha demostrado generar beneficios significativos ($p < 0,05$) respecto a la terapia convencional en cuanto a la percepción subjetiva de los pacientes sobre su capacidad funcional, evaluada mediante la escala Lysom. A su vez, se obtuvieron mejoras significativas ($p < 0,05$) en la fuerza flexora y extensora de rodilla, la

actividad eléctrica, a través de la electromiografía, de estos músculos durante los movimientos de flexión y extensión y en la propiocepción. No hubo diferencias significativas ($p > 0,05$) en parámetros relacionados con el dolor y la movilidad de la rodilla. En conclusión, el uso de la terapia acuática es más efectiva en la ganancia de funcionalidad, fuerza y propiocepción respecto a la rehabilitación convencional, probablemente debido a la disminución del efecto gravitacional que se propicia en el medio acuático por las características intrínsecas del agua. Por ello, la terapia acuática favorecería una recuperación precoz dirigida a recuperar la actividad habitual del paciente lo antes posible.

Keywords: Ligamento cruzado anterior, Terapia acuática, Actividad física, Fuerza, Movilidad, Estabilidad, Funcionalidad.

Eficacia de un programa de rehabilitación mediante realidad virtual en pacientes tras haber sufrido un accidente cerebrovascular. Una revisión sistemática de ensayos clínicos controlados.

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Introdução/Introduccion

El accidente cerebrovascular es una patología en la que se produce una detección momentánea del flujo sanguíneo cerebral. La falta de oxígeno y nutrientes genera daños cerebrales y diferentes grados de discapacidad en el paciente. La rehabilitación, centrada en la neuroplasticidad cerebral, es fundamental para mejorar la calidad de vida de los pacientes. La realidad virtual es un novedoso método de rehabilitación en el que se genera una simulación virtual con la que el paciente puede interactuar. El objetivo ha sido comparar la eficacia de la rehabilitación mediante realidad virtual frente a la rehabilitación convencional en la funcionalidad de la extremidad superior en pacientes tras haber sufrido un accidente cerebrovascular.

Métodos/Metodologia

Siguiendo las pautas metodológicas de los Elementos de Información Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA), se revisaron los estudios disponibles en las bases de datos Medline (PubMed), Physiotherapy Evidence Database (PEDro) y Scopus que evaluaran el grado de funcionalidad de la extremidad superior tras sufrir un accidente cerebrovascular. La calidad metodológica de los estudios seleccionados fue evaluada mediante las escalas PEDro y McMaster, y el riesgo de sesgo por medio de la herramienta de Cochrane. De los 208 estudios relacionados con la realidad virtual, solo 8 de los ensayos cumplieron con los criterios de inclusión y fueron seleccionados para realizar dicha revisión sistemática. La calidad metodológica de los estudios seleccionados fue categorizada como “buena”, “muy buena” o “excelente”, y el riesgo de sesgo como “bajo”.

Resultados e Conclusões/Resultados y Conclusiones

La rehabilitación mediante realidad virtual ha denotado mejoras significativas ($p < 0,05$) en el rango y velocidad de movimiento de la extremidad superior. A su vez, la calidad de vida del paciente evaluada por la Fugl-Meyer Assessment Upper Extremity también denotó mejoras significativas ($p < 0,05$). En conclusión, la rehabilitación mediante realidad virtual es beneficiosa en la mejora de la funcionalidad de la extremidad superior y en la calidad de vida del paciente en comparación con la rehabilitación convencional.

Estas mejoras podrían deberse a que estos programas de rehabilitación incrementan la motivación y la adherencia al tratamiento, aspectos fundamentales para generar mejoras en el paciente.

Keywords: Accidente cerebrovascular, Realidad virtual, Rehabilitación, Extremidad superior.

What is the most effective ACL injury prevention strategy in football? An Umbrella Review

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Introdução/Introduccion

The anterior cruciate ligament (ACL) is a fundamental part of the knee joint due to the role that it plays in stabilization and kinematics. ACL injuries are common in football to its nature of high-speed changes of direction which place stress on the knee joint. ACL injures require a lengthy rehabilitation period and can impact player performance even after successful surgery and return to play. ACL injury prevention is therefore a real focus in sport science. Which injury prevention programs are the most effective for preventing ACL injuries remains a debate and we decided to address this issue by means of an umbrella review of related factors to ACL injuries including prevention strategies.

Métodos/Metodologia

A comprehensive search of Web of Science, PubMed, and Scopus was conducted covering systematic reviews and meta-analyses studies from March 1st, 2022 to March 1st, 2025. Using the PICOS framework, eligible studies included male and female amateur or professional football players aged 18–50. Interventions focused on ACL injury prevention strategies, including strength training, balance exercises, and mobility training. Comparators included standard care or no intervention. Outcomes assessed were ACL injury rates and related prevention metrics.

Resultados e Conclusões/Resultados y Conclusiones

Results: From an initial pool of 62 systematic reviews identified, 5 focused on injury prevention, comprising 41 individual studies. The FIFA 11+ was the most frequently studied injury prevention program, evaluated across 12 studies with over 8,500 participants. It consistently reduced ACL injury risk and improved neuromuscular control across various levels of football, including youth, amateur, and professional athletes. Reported reductions in ACL injuries ranged from 32% to 76% (IRR = 0.24–0.68), with the most substantial effects observed in studies with high compliance. While most studies demonstrated significant benefits, some variability was noted, potentially due to differences in implementation fidelity. Similar neuromuscular training programs, such as PEP and 11+ Kids, also showed marked injury reductions (up to 82%) in female and recreational players. Overall, structured and consistently applied neuromuscular interventions effectively lower ACL injury rates in football populations. Conclusion: Consistent implementation of neuromuscular training programs like FIFA 11+ significantly reduces ACL injury risk across diverse football populations, highlighting their effectiveness as a preventative strategy. These findings support the routine

integration of structured injury prevention programs into team training, particularly at the youth and amateur levels where injury risk and lack of conditioning may be higher. Coaches, medical staff, and sport scientists should prioritize program adherence and tailor exercises to individual player needs to maximize impact. Regular education and monitoring may further enhance compliance and ensure long-term effectiveness in reducing ACL injuries in football.

Keywords: ACL injury prevention, Neuromuscular training, FIFA 11+, Prehabilitation, Rehabilitation, Injury prevention programs, Strength training, Balance exercises, Mobility training, Compliance, Injury incidence reduction.

Efecto de la hipoxia normobárica intermitente sobre la memoria de trabajo visoespacial en adultos jóvenes sanos

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Introdução/Introduccion

La hipoxia intermitente normobárica es una técnica emergente que consiste en la exposición controlada a periodos breves de baja concentración de oxígeno en condiciones de presión normal. Al entrar en un entorno hipóxico, la saturación de oxígeno en sangre (SpO2) del cuerpo humano disminuye, y la regulación del sistema nervioso autónomo cambia. El cerebro es especialmente sensible a los niveles de oxígeno disponibles, por lo que pequeñas variaciones pueden afectar al rendimiento cognitivo, en especial en funciones complejas como la memoria de trabajo. El objetivo del estudio fue evaluar si una sesión de hipoxia normobárica intermitente afecta a la memoria de trabajo visoespacial en adultos jóvenes sanos.

Métodos/Metodologia

Participaron 27 adultos jóvenes sanos (edad media = 24.2 ± 4.8 años), distribuidos aleatoriamente en dos grupos. El grupo experimental (GE; n = 13), fue expuesto a una sesión de hipoxia normobárica intermitente (12% O_2, equivalente a 4400 m) y el grupo control (GC; n = 14), permaneció en condiciones de normoxia. Se empleó el test Odd One Out de la plataforma Cambridge Brain Sciences para evaluar la memoria de trabajo visoespacial. Se evaluó el rendimiento en ambos grupos antes y después de la intervención.

Resultados e Conclusões/Resultados y Conclusiones

El GC mostró una mejora en la puntuación obtenida en el nivel en el test Odd One Out ($p=0,034$; IC 95%=3,69,-0,17; $\eta^2=0,301$) en el post-test. No se encontraron diferencias en el pre-post entre el GE y el GC para ninguna de las variables ejecutivas analizadas ($p>0,05$), ni efecto de la covariable sexo ($p>0,05$). Sin embargo, se encontraron diferencias significativas en las variables SaO_2 ($p=0,001$; IC 95%=2,89,10,18) y FC ($p=0,012$; IC 95%=-15,55,-1,37) tras la hipoxia en el GE. Por tanto, una única sesión de hipoxia normobárica intermitente no compromete esta función ejecutiva en jóvenes sanos. Se recomienda investigar los efectos de exposiciones repetidas o en poblaciones más sensibles, como adultos mayores o pacientes con deterioro cognitivo.

Keywords: Memoria de trabajo, hipoxia normobárica intermitente, cognición, funciones ejecutivas.

Efecto de una sesión de hipoxia normobárica intermitente sobre la atención sostenida en adultos jóvenes sanos.

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Introdução/Introduccion

La atención sostenida es un componente fundamental de las funciones ejecutivas que nos permite perseverar en una respuesta conductual durante una tarea continuada o repetitiva y mantener el foco en tareas durante períodos prolongados de tiempo. Su eficiencia puede ser modulada por factores fisiológicos como la oxigenación cerebral. La hipoxia intermitente normobárica ha emergido como una estrategia no invasiva prometedora con posibles beneficios cognitivos, especialmente en dominios como la atención. El objetivo de esta investigación fue analizar el efecto agudo de una sesión de hipoxia normobárica intermitente sobre la atención sostenida en adultos jóvenes sanos.

Métodos/Metodologia

Veintisiete participantes (edad media = 24.2 ± 4.8 años) fueron asignados aleatoriamente a un grupo experimental (GE; n = 13), que realizó una sesión de hipoxia intermitente (12% O_2, equivalente a 4400 m), o a un grupo control (GC; n = 14), que permaneció en condiciones de normoxia. La atención sostenida se evaluó mediante el test Double Trouble (Cambridge Brain Sciences) antes y después de la intervención. Este test evalúa la atención sostenida y el control inhibitorio frente a estímulos distractores semánticos, similares al efecto Stroop.

Resultados e Conclusões/Resultados y Conclusiones

Los resultados del estudio mostraron mejoras significativas en el rendimiento atencional en ambos grupos tras la intervención. En el GC, el rendimiento mejoró de forma robusta ($p=0.001$; 95%CI=-19.11,-7.61; $\eta^2=0.660$). Mientras que en el GE también se produjo una mejora significativa ($p=0.002$; 95%CI=-15.31,-4.23; $\eta^2=0.552$). Sin embargo, no se observaron diferencias significativas en la evolución pre-post entre grupos ($p > 0.05$), ni efectos moduladores del sexo. Estos resultados sugieren que una única sesión de hipoxia intermitente normobárica no compromete la atención sostenida y puede incluso facilitar su mejora en condiciones controladas.

Keywords: atención sostenida, hipoxia intermitente, cognición, gamificación.

La influencia de la formación, en la utilización del Bastón Policial Extensible, en las intervenciones policiales.

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Introdução/Introduccion

La eficacia de las intervenciones policiales se ve influenciada por la preparación del personal en el uso del bastón policial extensible. Este estudio investiga el impacto de un entrenamiento específico en la respuesta fisiológica y la toma de decisiones durante las intervenciones tácticas en que sea necesario el uso de la fuerza. La literatura científica disponible sobre el tema de esta investigación es muy limitada.

Métodos/Metodologia

- Diseño del Estudio: Estudio experimental con un grupo de estudio y un grupo control. - Muestra: 30 participantes de fuerzas policiales y militares. - Instrumentos: Plantilla de intervenciones prácticas, protocolo de estímulos y cuestionarios de evaluación. Se analizarán variables de saturación de oxígeno en sangre, frecuencia cardíaca, glucosa y lactato en sangre, temperatura corporal, manifestación de fuerza muscular de la parte superior e inferior del cuerpo, excitación cortical, estado de ansiedad y memoria y atención mediante un cuestionario antes y después de una simulación de intervención táctica. También con Flicker Fusion (UFF), se medirá la fatiga del sistema nervioso central y la función cognitiva. - Procedimiento: Los participantes realizarán simulaciones de intervenciones en que sea necesario el uso de la fuerza antes y después del entrenamiento. Seguido de una prueba de estrés pre y post intervención para medir la respuesta fisiológica de los operativos antes y después de una intervención simulada.

Resultados e Conclusões/Resultados y Conclusiones

- Analizar los efectos del tiempo de entrenamiento en la respuesta fisiológica del personal policial y militar. - Cuantificar la relación entre la formación y la toma de decisiones en situaciones de intervención. - Investigar la viabilidad de implementar un programa de formación para mejorar el desempeño en intervenciones que sea necesario el uso de la fuerza. - Con este proyecto, se intenta demostrar de manera científica cómo influyen los tiempos de formación a la hora de utilizar las habilidades aprendidas en situaciones complejas

Keywords: Formación, Bastón Policial Extensible, Intervención policial o militar, Uso de la Fuerza.

Qualidade de vida e Doença Renal Crônica: Quais são as alterações em diferentes cargas de treino de força (estudo preliminar)

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Introdução/Introduccion

A Doença Renal Crônica afeta diretamente a percepção dos sujeitos com a qualidade de vida, podendo gerar quadros de alterações cognitivas expressivas em virtude das restrições impostas pelo tratamento. Ainda pouco se sabe sobre o uso do método de treinamento com Restrição de Fluxo Sanguíneo (RFS) em variáveis perceptivas nos indivíduos. O objetivo deste estudo é avaliar os efeitos de 12 semanas de treinamento de força com o método de restrição de fluxo sanguíneo na percepção de qualidade de vida de pacientes com doença renal crônica (DRC) estágio 3.

Métodos/Metodologia

Ensaio clínico randomizado com 40 participantes de um Hospital de Alta Complexidade da Cidade de Maceió/Alagoas, divididos em 4 grupos (controle, baixa carga, alta carga, RFS), avaliados pelo questionário Short-Form 36 (SF-36). O treinamento foi realizado 3 vezes por semana, com duração de 30-45 minutos, com protocolos distintos de intensidade. Os resultados foram analisados pela normalidade (Shapiro-Wilk), comparação intra grupo (T-Pareado/Wilcoxon), comparação entre grupos (ANOVA/ Krushal-Wallis) e tamanho de efeito (Cohen's d).

Resultados e Conclusões/Resultados y Conclusiones

Participaram pessoas com idade de 58 ± 8,9 anos, 62% não diabéticos, 87,5% hipertensos e 60% com baixos níveis de atividade física. Em relação a comparação internas após a intervenção, a RFS apresentou melhora nos índices em todas as variáveis de QV, mas com significância nas dimensões limitação por aspectos físicos (p=0.042), aspectos sociais (p=0.049) e saúde mental (p=0.007) . O grupo alta carga somente apresentou significância na variável saúde mental (p=0.048), enquanto no grupo controle houve mudanças na capacidade funcional (p=0.49), aspectos emocionais (p=0.016) e saúde mental (p=0.036). O treinamento com baixa carga apresentou alterações significantes nas limitações por aspectos físicos (p=0.025), dor (p=0.057) e estado geral da saúde (p=0.007). No âmbito da comparação entre os grupos, somente a variável capacidade funcional apresentou diferença estatística do grupo RFS com a baixa carga (p=0.0251),

com tamanho de efeito médio (d=-0.796). Conclusão: O treinamento com RFS é viável e beneficia a percepção de qualidade de vida em pacientes com DRC-3, destacando-se como estratégia não farmacológica.

Keywords: qualidade de vida; falência renal; treinamento de força; oclusão vascular

Pérdida de velocidad como criterio para terminar una serie en press de banca: ¿afecta la fatiga previa?

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Introdução/Introduccion

En los últimos años, se ha demostrado la viabilidad del uso de la pérdida de velocidad (velocity loss, VL) en la serie para controlar el volumen en el entrenamiento de fuerza (Gonzalez-Badillo et al., 2017; Sánchez-Medina & González-Badillo, 2011). Este hecho está respaldado por la alta asociación observada entre la VL y la fatiga mecánica, así como la fatiga metabólica (Sánchez-Medina & González-Badillo, 2011). Además, existe una estrecha relación entre la VL y el porcentaje de repeticiones completadas (%Rep) en relación con el número máximo de repeticiones (Gonzalez-Badillo et al., 2017; Rodriguez-Rosell et al., 2019). Sin embargo, la relación entre el porcentaje de VL (%VL) y el %Rep solo se ha analizado en series aisladas. Por lo tanto, este estudio tuvo como objetivo analizar la relación entre el %Rep y el %VL después de diferentes esfuerzos previos (EP) en el ejercicio de press de banca.

Métodos/Metodologia

Doce hombres (edad: 21.5 ± 1.7 años, masa corporal: 78.3 ± 10.4 kg, estatura: 1.79 ± 0.05 m, fuerza relativa [una repetición máxima {1RM} dividida por la masa corporal]: 1.03 $kg \cdot kg^{-1}$) realizaron tres protocolos (separados por una semana), cada uno consistió en una serie al fallo con el 60% del 1RM, precedida por tres series con la misma carga pero diferentes magnitudes de %VL (0% VL: EP0, 20% VL: EP20, 60% VL: EP60). Los protocolos se realizaron en orden aleatorio, con una semana de separación entre cada uno de ellos. Para analizar y comparar la fatiga mecánica y metabólica inducida por cada EP, se midió la velocidad ante la carga correspondiente al 60% 1RM en el press de banca al inicio (Carga-V60), junto con la concentración de lactato en sangre ([Lact]) después del EP. Se realizó un análisis de varianza de medidas repetidas de un factor para analizar las diferencias entre protocolos en la serie PE para [Lact]. Además, se utilizó este análisis para examinar las diferencias entre la relación %Rep-%VL llevada a cabo después de cada serie PE. Se realizó un análisis de varianza de medidas repetidas 4 (protocolo: PE0, EP20, EP40, EP60) x 2 (tiempo: Pre vs. Post) para analizar las diferencias en la Carga-V60. Se aplicaron pruebas post hoc de Bonferroni, cuando se encontró una interacción significativa. Se aceptó significancia con $P \leq 0.05$. La relación %Rep-%VL se determinó utilizando el coeficiente de determinación (R^2) y el error estándar de estimación (SEE).

Resultados e Conclusões/Resultados y Conclusiones

Se observaron diferencias significativas pre-post EP en la Carga-V60 en todos los protocolos ($P \leq 0.05$). En cuanto a [Lact], EP60 mostró valores más altos que EP0 y EP20 ($P \leq 0.05$), y la [Lact] en EP20 fue significativamente mayor que en EP0 ($P \leq 0.05$). Se observó una alta relación %Rep-%VL después de cada EP ($R^2 = 0.93, 0.95, 0.92$; SEE = 7.14%, 6.26%, 7.09% para EP0, EP20 y EP60, respectivamente). Sin embargo, se encontraron diferencias significativas ($P < 0.05$) en el %Rep alcanzado en cada %VL del 10% al 25% entre EP60 y las demás condiciones de EP. En el ejercicio de press de banca, el %VL puede utilizarse para prescribir y monitorear el volumen de entrenamiento después de realizar tres series con diferentes niveles de esfuerzo. Sin embargo, cuando el nivel de esfuerzo durante la sesión es muy alto (es decir, entrenamiento cercano al fallo muscular en cada serie), el %Rep durante la primera parte de la serie (es decir, la primera mitad de las repeticiones completadas) parece diferir de cuando el nivel de esfuerzo durante la sesión es bajo o moderado.

Keywords: Entrenamiento de fuerza basado en la velocidad de ejecución, prescripción del volumen de entrenamiento, nivel de esfuerzo

"Interactions Between Citrulline Malate Supplementation and High-Intensity Interval Training in Enhancing Athletic Performance: A Narrative Review"

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Introdução/Introduccion

Regular physical activity is widely recognized for promoting physical and mental well-being and reducing the risk of chronic diseases, morbidity, and early mortality. Despite these benefits, around 1.4 billion people globally remain insufficiently active, often due to time constraints. High-intensity interval training (HIIT) has emerged as a time-efficient training approach that enhances both aerobic and anaerobic capacity through repeated bouts of intense effort followed by brief recovery. Its effectiveness makes it appealing to athletes and general populations alike. Alongside training strategies, nutritional interventions such as citrulline malate (CM) supplementation have gained attention for their performance-enhancing potential. CM, a compound consisting of L-citrulline and malate, is thought to boost nitric oxide production, increase blood flow, reduce fatigue, and support mitochondrial energy pathways. The combination of HIIT and CM may offer synergistic benefits, with HIIT inducing strong physiological stress and CM potentially enhancing recovery, buffering fatigue, and improving blood flow during and after intense effort. Understanding the interaction between these two strategies is increasingly important in sports science, particularly for maximizing performance while managing training demands. This narrative review explores the mechanisms and performance effects associated with CM supplementation and various HIIT modalities, particularly within the context of sports performance.

Métodos/Metodologia

A literature review was conducted using electronic databases (PubMed, Scopus, and Google Scholar), targeting research focused on CM supplementation, HIIT protocols, and athletic performance. Keywords included: amino acid, nitric oxide, ergogenic aid, physical fitness, VO_2max, and resistance training. Inclusion criteria were (1) investigation of the effects of CM supplementation on exercise performance, (2) examination of the effects of different modes of HIIT on exercise performance, (3) human participants, and (4) reporting of relevant outcomes such as aerobic capacity, anaerobic performance, or

other measures of exercise performance. Non-English and irrelevant studies were excluded.

Resultados e Conclusões/Resultados y Conclusiones

HIIT, characterized by repeated high-effort intervals with short rest periods, promotes significant improvements in aerobic and anaerobic performance. CM, a combination of L-citrulline and malate, is proposed to enhance nitric oxide synthesis, increase blood flow, reduce fatigue, and support energy metabolism via the aspartate-malate shuttle. While CM has shown promise in improving strength and endurance outcomes, findings across studies investigating the optimal dose, timing, mechanism of action, as well as reliable sources of purchase for CM consumption. remain limited and unclear. Many studies have involved untrained populations, and evidence in elite athletes is limited. Additionally, improper supplement use without professional oversight poses safety concerns, including the risk of contamination and inadvertent doping.

Keywords: Athletic Performance, Citrulline Malate, Ergogenic Aids, High-Intensity Interval Training (HIIT), Nitric Oxide, VO_2max

Efectos de distintos enfoques de pliometría en la velocidad y agilidad en jugadores de fútbol

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Introdução/Introduccion

El fútbol es un deporte de cooperación-oposición de carácter intermitente. Las acciones explosivas como el COD o el sprint suelen ser las más determinantes en el resultado. El entrenamiento de pliometría es considerado como uno de los métodos de entrenamiento más eficaces para la mejora de estas acciones (Izquierdo et al., 2002). Existen diferentes tipos de pliometría, como la horizontal y la vertical, cada una con efectos y beneficios diferentes (Moran et al., 2024) Sin embargo, existe controversia sobre cuál de las dos resulta más efectiva en el rendimiento deportivo.

Métodos/Metodologia

23 jugadores de un mismo equipo de fútbol senior amateur participaron en el estudio, de los cuales 4 de ellos fueron excluidos por diferentes motivos. Los jugadores fueron divididos en 2 grupos de forma aleatoria: HPJ (n = 10) y VPJ (n = 9). Se realizaron el test de tiempo de sprint de 30 m en línea recta y el test de lllinois en dos momentos, pre-, post-intervención. La intervención se realizó 2 veces a la semana durante 10 semanas, y constaba de 3 ejercicios de salto para cada grupo en función de la dirección de los mismos.

Resultados e Conclusões/Resultados y Conclusiones

Los resultados obtenidos demostraron diferencias significativas entre el momento pre y post en el test de sprint en HPJ ($p < .001$.; TE = 0.480). En este mismo test, no se encontraron diferencias significativas en VPJ ($p = .085$). En el test de Illinois no se encontraron diferencias estadísticamente significativas en la interacción entre el momento pre y post intervención y los diferentes tipos de intervención ($p= .473$). En conclusión, el entrenamiento de salto con un vector horizontal puede resultar más efectivo que un entrenamiento con vector vertical para la mejora de la capacidad de sprint en jugadores de fútbol. En cambio, ninguna de las dos orientaciones pliométricas parece generar un efecto importante sobre la capacidad de agilidad.

Keywords: pliometría, horizontal, vertical, sprint, agilidad.

Parámetros morfológicos y funcionales en la marcha de niños con enfermedad de Sever unilateral: comparación intrasujeto

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Introdução/Introduccion

La apofisitis calcánea (enfermedad de Sever) es una causa común de dolor en el talón en niños y adolescentes en crecimiento, en la que el tendón de Aquiles tracciona excesivamente de la placa de crecimiento aún inmadura del calcáneo. Produce dolor especialmente durante la marcha y actividades deportivas, lo que la convierte en limitante para los niños y afecta a su calidad de vida. El objetivo fue comparar parámetros morfológicos y funcionales durante la marcha entre el pie afectado y el no afectado en sujetos con Sever unilateral.

Métodos/Metodologia

Estudio observacional transversal de 13 niños con enfermedad de Sever unliateral. Se realizó una evaluación morfológica con ecografía (Vscan AirTM) del tendón de Aquiles, fascia plantar y gastrocnemios, incluyendo medidas sobre tamaño y calidad de los tejidos. Posteriormente se realizó un análisis de la marcha a 4km·h-1 y 5 km·h-1 en un tapiz rodante, utilizando sensores inerciales (RunScribeTM), para estudiar los parámetros espacio-temporales y cinéticos. En análisis estadístico se realizó con Phython (versión 3.10.10) estableciendo el nivel de signifcación en $p<0.05$.

Resultados e Conclusões/Resultados y Conclusiones

El impacto vertical y la fuerza de frenada mostraron diferencias estadísticamente significativas, siendo ambas variables mayores en el pie afecto. Además, el tamaño del efecto fue muy grande en ambas, lo que confirma la potencia de esas diferencias. Sin embargo, no se encontraron diferencias en ninguna de las variables ecográficas. Este estudio sugiere que, en estos niños, la sintomatología podría estar relacionada con la carga dinámica y las fuerzas de reacción del suelo más que con diferencias morfológicas observables. Contribuye a conocer en profundidad en el comportamiento biomecánico del Sever para mejorar su abordaje en el entorno clínico.

Keywords: Niños, dolor en el talón, apofisitis calcánea, enfermedad de Sever, marcha.

Impacto dos jogos de pequena dimensão com modelos de distração no desempenho e comportamento de jogadores de futebol

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Introdução/Introduccion

O futebol, um dos desportos mais populares do mundo, tem sido alvo de extensas pesquisas para melhorar o desempenho dos jogadores e as estratégias da equipa. Nos últimos anos, os jogos de pequena dimensão (SSGs) têm ganho uma atenção significativa como um método de treino eficaz que desenvolve as competências técnicas, a consciência tática e a aptidão física [1,2]. Os SSGs são versões modificadas do jogo completo, geralmente envolvendo menos jogadores e campos mais pequenos, o que permite um maior envolvimento dos jogadores e uma maior frequência de ações específicas [3,4]. A eficácia dos SSGs na melhoria de vários aspetos do desempenho no futebol está bem documentada na literatura. Halouani e outros. (2014) destacaram que os SSGs podem melhorar o condicionamento físico, a proficiência técnica e a compreensão tática dos jogadores, mantendo um elevado nível de motivação devido à natureza lúdica dos exercícios [5]. Este sentimento é ecoado por Aguiar et al. (2012), que enfatizou a versatilidade dos SSGs no cumprimento de múltiplos objetivos de treino [6]. A adaptabilidade dos SSGs permite aos treinadores manipular parâmetros como o tamanho do campo, o número de jogadores e as modificações das regras para atingir resultados fisiológicos e técnico-táticos específicos [7,8]. Os benefícios fisiológicos dos SSGs têm sido um foco particular de investigação. Hill-Haas e outros. (2011) realizaram uma revisão sistemática que demonstrou a eficácia dos SSGs na melhoria da aptidão aeróbia, com alguns estudos a apresentarem resultados comparáveis ou mesmo superiores aos métodos tradicionais de treino intervalado [8]. Owen e outros.exploraram como a alteração do tamanho dos campos e do número de jogadores nos SSGs pode influenciar as exigências fisiológicas e técnicas dos jogadores, fornecendo aos treinadores insights valiosos para adaptar as sessões de treino a objetivos específicos [9]. Numa perspetiva técnica e tática, os SSG oferecem um ambiente único para o desenvolvimento de competências. Sarmento e outros. (2018) realizaram uma revisão sistemática abrangente destacando o impacto positivo dos SSGs nas capacidades de tomada de decisão dos jogadores, na precisão dos passes e na inteligência geral do jogo [7]. A natureza restrita dos SSGs obriga os jogadores a tomar decisões mais rápidas e a executar habilidades sob pressão, imitando de perto as exigências das partidas competitivas [10]. Embora os benefícios dos SSGs estejam bem estabelecidos, existe um interesse crescente em compreender como os fatores externos, principalmente as distrações, podem influenciar o desempenho e o comportamento dos jogadores durante estes cenários de treino. O conceito de distração no desempenho desportivo tem sido explorado em vários contextos, com estudos a demonstrar o seu potencial para dificultar e, em alguns casos, melhorar o desempenho atlético [11- 13]. Especificamente no futebol, o impacto das distrações tem

sido estudado principalmente em situações de alta pressão, como os penáltis. Furley e outros. (2017) examinaram como as distrações induzidas pelo guarda-redes afetaram o desempenho dos marcadores de grandes penalidades, destacando a interação psicológica entre o marcador e o guarda-redes [14]. Esta pesquisa sublinha o potencial das distrações deliberadas para influenciar os resultados de desempenho em momentos críticos do jogo.O papel da atenção e do foco no desempenho futebolístico foi ainda mais enfatizado por Tedesqui e Orlick (2015), que exploraram os padrões de foco atencional entre jogadores de futebol de elite em várias posições de jogo e tarefas de desempenho [15]. As suas descobertas sugerem que diferentes papéis no jogo podem exigir estratégias de atenção distintas, o que pode afetar a forma como os jogadores respondem às distrações durante os SSGs. Estudos recentes começaram a explorar a intersecção entre as exigências cognitivas e o desempenho físico no futebol. Ferreira e cols. (2024) investigaram os efeitos do esforço cognitivo pro

Métodos/Metodologia

Foi adotada uma abordagem sistemática e multifacetada para garantir uma pesquisa bibliográfica abrangente e rigorosa. O principal objetivo foi identificar estudos relevantes que explorassem o impacto dos jogos de pequena dimensão com modelos de distração no desempenho e comportamento dos jogadores de futebol, abrangendo uma vasta gama de fontes e veículos de publicação. A pesquisa bibliográfica começou com uma ampla exploração de bases de dados eletrónicas, incluindo PubMed, SPORTDiscus, Web of Science e Google Scholar. Estas bases de dados foram escolhidas pela sua cobertura abrangente de literatura com revisão por pares em ciências do desporto, fisiologia do exercício e disciplinas relacionadas. A estratégia de pesquisa envolveu a construção cuidadosa de sequências de pesquisa que combinavam palavras-chave relevantes e operadores booleanos. Foram utilizados os seguintes termos de pesquisa: ("jogos reduzidos" OU "futebol reduzido" OU "jogos condicionados") E (distração* OU atenção* OU carga cognitiva OU pressão OU stress) E (futebol OU futebol americano) E (desempenho OU comportamento OU tomada de decisão OU execução de habilidades).A pesquisa não foi limitada pela data de publicação ou desenho do estudo para captar uma vasta gama de estudos. Esta abordagem garantiu que os trabalhos seminais e a investigação fundamental sobre o tema fossem incluídos na revisão, independentemente do ano de publicação. Além disso, não foram impostas restrições quanto à idade ou ao nível de habilidade dos jogadores de futebol envolvidos nos estudos, uma vez que a revisão teve como objetivo fornecer uma compreensão abrangente do impacto das distrações em vários estágios de desenvolvimento e níveis competitivos. Reconhecendo o potencial de estudos relevantes serem publicados em fontes para além da pesquisa inicial na base de dados, foi conduzida uma pesquisa manual complementar. As listas de referências de revisões, meta-análises e artigos de investigação primária anteriormente publicados foram cuidadosamente selecionadas para identificar estudos adicionais que possam ter sido esquecidos nas pesquisas em bases de dados eletrónicas. A pesquisa foi alargada para incluir atas de conferências, dissertações e teses relacionadas com o tema para ampliar ainda mais o âmbito. Para além da pesquisa bibliográfica, foram consultados

especialistas em ciências do desporto, psicologia do exercício e desempenho no futebol para identificar possíveis estudos ou projetos de investigação em curso que possam não ter sido captados pelas pesquisas iniciais. O método de pesquisa abrangente e o amplo âmbito adotados nesta revisão tiveram como objetivo captar vários estudos de diversas fontes, veículos de publicação e disciplinas de investigação.

Resultados e Conclusões/Resultados y Conclusiones

O exame abrangente dos SSG com distrações e a sua influência no comportamento dos jogadores de futebol revelou uma interação complexa entre os processos cognitivos, o desempenho físico e os fatores ambientais. Esta área de investigação tem implicações significativas para o desenvolvimento dos jogadores, metodologias de treino e estratégias de preparação de jogos no futebol. Foi demonstrado que a integração de distrações nos SSGs induz mudanças comportamentais notáveis nos jogadores, afetando os seus processos de tomada de decisão, comportamentos de risco e consciência tática geral. Estas alterações reflectem as respostas adaptativas dos jogadores ao aumento das exigências cognitivas, realçando a natureza dinâmica do desempenho no futebol em condições variadas. O impacto das distrações na carga cognitiva durante os SSGs surgiu como um fator crítico na compreensão do desempenho dos jogadores. Embora o aumento da carga cognitiva possa inicialmente prejudicar o desempenho, também apresenta oportunidades para o desenvolvimento de competências cognitivas e uma maior resiliência a pressões semelhantes às de uma partida. O desafio reside em encontrar o nível ideal de desafio cognitivo que promova o crescimento sem sobrecarregar os recursos mentais dos jogadores. O foco de atenção na presença de distrações foi identificado como um determinante crítico da qualidade do desempenho nos SSG. A capacidade de alocar eficientemente os recursos de atenção e filtrar informações relevantes de distrações parece ser uma capacidade treinável que pode influenciar significativamente a eficácia de um jogador em campo. A investigação nesta área também destacou a importância do treino individualizado e de abordagens de gestão de distrações.Fatores como a posição de jogo, o nível de habilidade e as características cognitivas pessoais contribuem para a forma como os jogadores respondem e gerem as distrações nos SSG, sugerindo a necessidade de estratégias de treino personalizadas. À medida que o futebol continua a evoluir, com crescentes exigências físicas e sistemas táticos mais complexos, a capacidade de atuar sob diversas formas de distração torna-se cada vez mais crucial. Os insights obtidos ao estudar SSGs com distrações oferecem ferramentas valiosas para aumentar a resiliência cognitiva e a adaptabilidade dos jogadores, o que se pode traduzir num melhor desempenho em cenários de partidas completas. O campo apresenta inúmeras possibilidades interessantes para futuras pesquisas, desde a exploração de novos tipos de distrações até à investigação dos efeitos a longo prazo do treino rico em distrações no desenvolvimento do jogador. A integração de tecnologias avançadas e abordagens interdisciplinares promete aprofundar a nossa compreensão dos aspetos cognitivos do desempenho no futebol. Concluindo, estudar SSGs com distrações representa um terreno fértil para fazer avançar o nosso conhecimento sobre o comportamento e os processos cognitivos dos jogadores de futebol.

Ao continuar a explorar esta área, os investigadores e profissionais podem desenvolver metodologias de treino mais sofisticadas e baseadas em evidências que preparem os jogadores para os desafios multifacetados do futebol moderno. À medida que o jogo avança, os insights obtidos com esta investigação desempenharão um papel crucial na formação do futuro do desenvolvimento dos jogadores e na melhoria do desempenho no futebol.

Keywords: Cognitive load, attentional focus, training methodologies, performance metrics

Optimización del Rendimiento Ciclista mediante un nuevo Sistema de Telemetría para el Estudio de la Presión de Inflado de Neumáticos.

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Introdução/Introduccion

En el ciclismo, el análisis de las fuerzas que actúan sobre el conjunto ciclista-bicicleta [CCB] resulta fundamental para tratar de optimizarlas y mejorar el rendimiento (1). Entre ellas se encuentra la fuerza de resistencia a la rodadura [FRR], modificada entre otros factores por la presión de inflado de los neumáticos (2). El presente estudio describe el desarrollo e implementación de un sistema de telemetría de bajo coste, orientado al monitoreo en tiempo real de variables en tiempo real, durante la práctica ciclista, para evaluar el efecto de la presión de inflado sobre la FRR en condiciones reales (3). El objetivo principal es describir la relación entre la presión de inflado de los neumáticos y la FRR, para determinar el rango de presión óptima y así optimizar la eficiencia mecánica y por tanto el rendimiento de los ciclistas.

Métodos/Metodologia

Se llevó a cabo un estudio de caso con un ciclista en el velódromo de Zaragoza, se registraron 71 mediciones de 1Km cada una, en condiciones meteorológicas similares, probando seis presiones de inflado diferentes [4, 5, 6, 7, 8 y 10 Bar] en unos neumáticos Continental Gator Skin 25mm. Se equipó la bicicleta de contrarreloj del ciclista con un potenciómetro de pedal [Favero Electronics SRL, Arcade TV, Italy] (4) y un sensor de velocidad magnético, además de utilizar una estación meteorológica [Kestrel Meter 5500, NK Company, USA] para medir la densidad del aire y una báscula digital, peso promedio del CCB= 72,38 Kg. El sistema de telemetría desarrollado capturó y combinó los datos de los sensores en tiempo real, para aplicar un modelo de regresión lineal con cada una de las diferentes presiones, y obtener los coeficientes que permitieron calcular la FRR y el coeficiente aerodinámico [CdA], basándose en las fórmulas matemáticas descritas por Debraux et al. [2011] (5). Posteriormente se utilizó una regresión cuadrática para analizar la relación entre la presión y la FRR, y se realizó la prueba t de Student para determinar la significancia estadística entre la FRR de las diferentes presiones.

Resultados e Conclusões/Resultados y Conclusiones

Se observó una relación cuadrática con una alta bondad de ajuste [R^2 = 0,9413]. Los valores más bajos de FRR se obtuvieron con presiones intermedias a 6, 7 y 8 Bar, mientras que las presiones más bajas [4 y 5 Bar] y más altas [10 Bar], presentaron valores de FRR

significativamente mayores. Los valores de FRR fueron los siguientes: 6,12 N a 4 Bar, 5,42 N a 5 Bar, 4,67 N a 6 Bar, 4,85 N a 7 Bar, 4,58 N a 8 Bar y 5,26 N a 10 Bar. En base a estos valores, se identificaron 6, 7 y 8 Bar como valores de presión óptimos para minimizar la FRR, mientras que 4, 5 y 10 Bar se clasificaron como no óptimos. La prueba t de Student [t[4] = 3,095, p = 0,036 < α = 0,05, d de Cohen = 0,14] mostró diferencias estadísticamente significativas en la FRR entre las presiones consideradas como óptimas [6, 7 y 8 Bar] y las no óptimas [4, 5 y 10 Bar]. Estas diferencias suponen hasta un 9 % más de potencia absoluta requerida por el ciclista para mantener una misma velocidad: ±14 W usando presiones óptimas frente a no óptimas, pedaleando a una potencia de 150 W y una velocidad de 31,8 km/h. El CdA se mantuvo estable durante todo el estudio [CV = 2,62 %], lo que indica que el ciclista pudo mantener una posición aerodinámica prácticamente idéntica en las 71 tandas de prueba. Esta consistencia permite una observación clara y aislada de la variación de la FRR en función de la presión de inflado de los neumáticos. Este estudio subraya que la presión de inflado de los neumáticos influye de manera significativa en la resistencia a la rodadura, revelando una relación cuadrática entre ambas variables cuando se mide en superficies reales, con una rugosidad moderada, como la superficie de concreto del Velódromo de Zaragoza. Esta superficie se considera más representativa de las carreteras secundarias típicas donde los ciclistas de ruta suelen entrenar y competir, en comparación con el parquet perfectamente liso de los velódromos olímpicos. Desde un punto de vista práctico, los hallazgos sugieren que una presión de neumáticos de 6 Bar es óptima para ciclistas con características similares al sujeto de este estudio, con un peso del CCB = 72,38 kg, y usando unos neumáticos de 25mm. La presión de 6 Bar obtuvo valores de FRR cercanos a los mínimos registrados en este estudio con otra presión óptima [8 Bar], pero se recomienda la presión de 6 Bar puesto que proporcionará un mejor agarre en curva en carretera frente otras presiones optimas como 7 u 8 Bar. El sistema de telemetría de bajo coste utilizado en este estudio demostró ser un método altamente eficaz para determinar la presión óptima de los neumáticos. Al integrar datos en tiempo real de múltiples sensores en la bicicleta, permitiendo una optimización de la presión adaptada a cada ciclista y a las características específicas de la superficie, reduciendo así la FRR y mejorando la eficiencia y el rendimiento del ciclista de manera significativa. Investigaciones futuras podrían replicar esta metodología sobre superficies con diferentes niveles de rugosidad, distintos tipos de neumáticos y ciclistas con diferentes pesos corporales para validar y generalizar aún más la aplicabilidad de los hallazgos. En relación con las becas y fuentes de financiación, los autores declaran que no existen conflictos de interés. Sin embargo, desean agradecer públicamente a las empresas Bikone Bearings y Mecanizados PG, las cuales colaboraron facilitando algunos de los materiales empleados en el desarrollo del presente estudio, así como a la Federación Aragonesa de Ciclismo por facilitar el acceso a las instalaciones del Velódromo Municipal de Zaragoza.

Keywords: cilismo, bicicleta, "resistencia a la rodadura", aerodinámica, velódromo, telemetría, "presión de inflado".

Uso de Suplementos Dietéticos entre Culturistas Aficionados en Turquía: Informe Preliminar

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Introdução/Introduccion

Los suplementos dietéticos (SD) son de gran interés entre los culturistas hoy en día debido a sus efectos para mejorar el rendimiento y favorecer el desarrollo muscular. Sin embargo, su uso inconsciente puede provocar consecuencias adversas para la salud. Especialmente entre los atletas aficionados, los factores de riesgo aumentan debido a la falta de información, una orientación inadecuada y la obtención de datos desde fuentes poco fiables. Esta investigación tuvo como objetivo examinar los hábitos de uso de suplementos deportivos, la frecuencia de consumo, los tipos preferidos y las fuentes de motivación entre atletas aficionados en Türkiye.

Métodos/Metodologia

Este estudio evaluó el uso de SD por parte de culturistas aficionados (n=36) que entrenan en diversos centros deportivos en Estambul, Türkiye. Se recopilaron datos sociodemográficos, sobre entrenamiento físico y sobre los patrones de uso de SD mediante entrevistas presenciales. Los datos obtenidos fueron analizados con el programa estadístico Jamovi (versión 2.6.44).

Resultados e Conclusões/Resultados y Conclusiones

La edad media de los participantes fue de 22,8 ± 5,7 años, con una altura media de 176,0 ± 7,5 cm y un peso corporal de 80,3 ± 15,4 kg. El 86,1 % de los culturistas eran hombres y el 13,9 %, mujeres. La mitad de los participantes afirmaron conocer la normativa sobre el uso de SD. Los suplementos más consumidos fueron creatina monohidratada (44,4 %), proteína de suero (33,3 %) y cafeína (27,8 %). Les siguieron omega-3 (25,0 %), magnesio (22,2 %), glutamina (22,2 %), bebidas deportivas (19,4 %), barritas deportivas (19,4 %), proteína de carne (19,4 %), vitamina D (16,7 %), vitamina C (16,7 %) y carnitina (16,7 %). También se reportó el uso de zinc (13,9 %), arginina (13,9 %), ZMA (13,9 %), productos pre-entreno (13,9 %), carbohidratos en polvo (11,1 %), hierro (11,1 %), beta-alanina (11,1 %), citrulina (11,1 %) y té verde (11,1 %). Las principales motivaciones para consumir suplementos fueron mejorar el rendimiento deportivo (41,7 %) y la apariencia física (36,1 %). La mayoría adquiría los productos por internet (52,8 %) y en farmacias (11,1 %). Este estudio preliminar demuestra que el uso de SD es común entre los culturistas aficionados en Türkiye. Los hallazgos subrayan la necesidad de mayor concienciación y de fuentes fiables de información sobre la normativa para garantizar un uso seguro. El estudio está financiado por el programa TUBITAK 2209A.

Keywords: culturismo, nutrición, deporte, suplementos

Exploración del uso de suplementos nutricionales en jugadores turcos de balonmano: un estudio piloto

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Introdução/Introduccion

El balonmano es un deporte popular que implica elevadas exigencias físicas, fisiológicas y psicológicas. Además de movimientos de alta intensidad, los jugadores requieren fuerza, agilidad, velocidad y una buena condición aeróbica para soportar los esfuerzos exigidos. Una estrategia nutricional óptima contribuye a mantener el rendimiento físico y cognitivo, prevenir lesiones, favorecer la vuelta al juego y las adaptaciones al entrenamiento, así como a acelerar y optimizar los procesos de recuperación. La literatura señala que los jugadores de balonmano tienden a usar suplementos nutricionales (SN) para alcanzar sus objetivos dietéticos. Por tanto, estudiar cómo los atletas de balonmano utilizan los SN puede aportar una comprensión importante de los factores que influyen en su rendimiento.

Métodos/Metodologia

Este estudio transversal incluyó la participación de 56 jugadores de balonmano (12 mujeres y 44 hombres) de diferentes ligas turcas, seleccionados mediante muestreo por conveniencia. El formulario de recogida de datos incluyó valores antropométricos, características del entrenamiento, tipos de SN consumidos y factores relacionados con la suplementación. Los datos fueron analizados con el programa estadístico Jamovi (versión 2.6.44).

Resultados e Conclusões/Resultados y Conclusiones

La edad media fue de 23,7 ± 8,5 años, con una altura media de 184,0 ± 8,7 cm y un peso corporal de 84,1 ± 15,0 kg. El 82,1 % eran jugadores profesionales y el 39,2 % competía internacionalmente. Los SN más utilizados fueron: magnesio (57,1 %), vitamina C (32,1 %), bebidas deportivas (30,4 %), proteína de suero (30,4 %), vitamina D (28,6 %), barritas deportivas (28,6 %), creatina (23,2 %), omega-3 (23,2 %), cafeína (17,9 %), preentrenos (16,1 %), vitamina E (12,5 %), carbohidratos en polvo (12,5 %), hierro (10,7 %), complejos vitamínicos (10,7 %), aminoácidos esenciales (8,9 %) y glutamina (8,9 %). Las principales motivaciones para el consumo fueron: mejorar el rendimiento (78,6 %), mantener la salud (57,1 %) y apoyar la apariencia física (26,8 %). El lugar más común de

compra fue internet (62,5 %). Estos datos subrayan la importancia de elecciones informadas y de la orientación profesional.

Keywords: balonmano, nutrición, deporte, suplementos

Actividad física y alimentación intuitiva en adultos mayores con diabetes tipo 2: una perspectiva de salud conductual

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Introdução/Introduccion

A medida que la población mundial sigue envejeciendo, los adultos mayores enfrentan una mayor carga de enfermedades y múltiples condiciones de salud en comparación con las personas más jóvenes. La diabetes mellitus tipo 2 (T2DM) se encuentra entre las enfermedades crónicas más comunes en este grupo de edad. Con el envejecimiento, la sensibilidad a la insulina disminuye y el control sobre los hábitos alimentarios se debilita, lo que puede dificultar la regulación de la glucosa en sangre y aumentar el riesgo de desarrollar T2DM. La alimentación intuitiva, que consiste en responder a señales internas de hambre y saciedad en lugar de seguir reglas dietéticas externas, ha surgido como un concepto relevante en el cuidado de la diabetes. Asimismo, la actividad física sigue siendo un factor clave en el manejo de esta enfermedad. Este estudio explora la actividad física y la alimentación intuitiva en personas de 65 años o más con T2DM.

Métodos/Metodologia

Este estudio utilizó un formulario sociodemográfico, la Escala de Alimentación Intuitiva 2 (IES-2), el Examen Cognitivo Mini-Mental (MMSE) y el Cuestionario Internacional de Actividad Física - Versión Corta (IPAQ-SV) para personas geriátricas diagnosticadas con diabetes mellitus tipo 2 (T2DM). El análisis de los datos se realizó utilizando el programa estadístico Jamovi.

Resultados e Conclusões/Resultados y Conclusiones

El estudio se llevó a cabo con la participación de 165 personas geriátricas diagnosticadas con diabetes mellitus tipo 2 (T2DM), de las cuales el 63,2% eran mujeres y el 36,8% hombres. La edad, estatura y peso de los participantes fueron 69.8±4.5 años, 163±8.4 cm y 77.4±13.8 kg, respectivamente. Según los resultados del MMSE, el 67.9% de los participantes se encontraba cognitivamente saludable y el 32.1% presentó síntomas mentales leves. Los datos del IPAQ-SV mostraron que el 65.9% de los participantes eran inactivos, el 29.9% mínimamente activos y el 4.3% suficientemente activos. Mientras que la puntuación media total del IES-2 fue de 3.22±0.3, el 78.8% mostró una mayor tendencia hacia el comportamiento de alimentación intuitiva. Los hallazgos indican que, aunque la mayoría de los adultos mayores con T2DM presentan bajos niveles de actividad física, muestran una alta inclinación hacia la alimentación intuitiva. Esto sugiere que, además de fomentar la actividad física, los comportamientos alimentarios también deben

considerarse un aspecto clave para apoyar la salud de los adultos mayores con diabetes. El estudio está financiado por el programa TUBITAK 2209A.

Keywords: envejecimiento, alimentación, diabetes, actividad física.

Estrategias preventivas para la pérdida de densidad mineral ósea en mujeres: revisión sistemática

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Introdução/Introduccion

La osteoporosis es un trastorno esquelético sistémico caracterizado por una reducción de la densidad mineral ósea (DMO) y el deterioro de la microarquitectura del tejido óseo (Pouresmaeili et al., 2018). Esta condición se agrava aún más por la desregulación de las células inmunitarias, lo que acelera la resorción ósea y aumenta el riesgo de fracturas, junto con el progresivo descenso de los niveles de estrógeno con el envejecimiento (Fischer & Haffner-Luntzer, 2022). Tal como señalan Akkawi y Zmerly (2018), la fragilidad resultante de estos cambios estructurales eleva significativamente la probabilidad de fracturas. Entre los diversos factores etiológicos, la menopausia es uno de los principales contribuyentes al inicio de la osteoporosis, siendo las mujeres caucásicas posmenopáusicas particularmente susceptibles (Sozen et al., 2017).

Métodos/Metodologia

Se llevó a cabo una revisión sistemática utilizando las bases de datos PubMed, Web of Science y Scopus, siguiendo las directrices PRISMA (2020). Se incluyeron los estudios que cumplían con los siguientes criterios: (i) la muestra consistía exclusivamente en mujeres; (ii) las participantes ya habían experimentado la menopausia; y (iii) los sujetos eran referidos como 'mujeres posmenopáusicas'. Se excluyeron los estudios si el texto completo no estaba disponible o si no eran artículos de investigación originales. La calidad metodológica de los estudios incluidos se evaluó utilizando la escala PEDro. Se incluyeron un total de 4 estudios, que comprendían una muestra total de 425 mujeres posmenopáusicas.

Resultados e Conclusões/Resultados y Conclusiones

Resultados: Las intervenciones basadas en ejercicio se asociaron con mejoras significativas en la densidad mineral ósea entre mujeres posmenopáusicas. La evidencia también respalda mayores beneficios cuando el ejercicio se combina con terapias complementarias, como la suplementación con calcio o la terapia de reemplazo con estrógenos, especialmente en programas que incluyen ejercicios de carga y de resistencia. Conclusión: Los hallazgos resaltan la relevancia del ejercicio físico en la mejora de la densidad mineral ósea en mujeres posmenopáusicas. Las intervenciones basadas en el ejercicio representan una estrategia clave para la prevención de la osteoporosis; sin

embargo, los programas que combinan ejercicio con terapia estrogénica tienden a mostrar efectos mayores. Los resultados reportados incluyen tanto efectos beneficiosos como eventos adversos potenciales, lo que proporciona una comprensión más matizada de los enfoques preventivos disponibles en esta población.

Keywords: Posmenopausia, ejercicio físico, osteoporosis

Uso de plantillas inteligentes para analizar la marcha en condición simple y dual en mujeres con fibromialgia

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Introdução/Introduccion

Las mujeres con fibromialgia presentan dificultad para realizar actividades de la vida diaria (AVD) (Huijnen et. al. 2015) debido a los síntomas (fatiga, rigidez, alteración del sueño, ansiedad, depresión y deterioro del equilibrio) del trastorno reumatológico que padecen, caracterizado por dolor muscular y articular generalizado. Estos síntomas junto con problemas cognitivos entre otros pueden afectar al rendimiento y al control postural (Bayazıt et. al. 2002). Normalmente las AVD requieren, de manera simultánea, de la realización de una tarea cognitiva y otra motora, a esto se le conoce como tarea dual. En personas mayores o con problemas reumatológicos, la capacidad de realizar las dos tareas se ve reducida (Martín-Martínez, et. al 2020), dando lugar a un aumento del riesgo de caídas y, por tanto, a una menor independencia y calidad de vida. Objetivo: analizar variables cinemáticas de la marcha en condición simple y dual.

Métodos/Metodologia

12 mujeres sanas (50.83±5.52) y 12 mujeres con fibromialgia (53.25±8.53) caminaron 3 minutos en una cinta de caminata en condición simple (caminar) y dual (caminar y test stroop), con 5 minutos de descanso entre pruebas, aleatorizándose el orden de las pruebas. La caminata la realizaron con unas plantillas inteligentes en el zapato para extraer las métricas cinemáticas de la marcha. Se utilizó la prueba de U de Mann-Whitney para comparar el rendimiento en personas con fibromialgia vs sanas, tanto en condición simple como dual. Además, se calculó el coste de la doble tarea (CDT) para comparar el efecto de la interacción de la tarea entre grupos con la U de Mann-Whitney. La prueba de Wilcoxon se utilizó para evaluar el efecto de la condición dual.

Resultados e Conclusões/Resultados y Conclusiones

se observaron diferencias significativas intergrupales (fibromialgia vs sanas) en condición simple y dual en la velocidad de marcha, así como en la longitud de paso de la pierna izquierda y derecha. Para el análisis del CDT se hallaron diferencias en la anchura

del paso del pie izquierdo (fibromialgia vs sanas). En el análisis intragrupal se encontraron diferencias significativas en el tiempo de doble apoyo para el grupo de mujeres sanas y con fibromialgia. Conclusión: las mujeres con fibromialgia presentan una marcha más lenta y cautelosa en condición simple y dual. En el grupo de fibromialgia se observó un efecto de la interacción de la tarea en el CDT, estas mujeres aumentaron la anchura de paso izquierdo. Esto supone una ligera modificación del patrón de la marcha que podría deberse a un mayor descontrol del centro de masas. Aunque, el tiempo de doble apoyo fue significativamente mayor en condición dual comparado con el simple para ambos grupos de mujeres.

Keywords: caminar, dolor, espaciotemporal, rendimiento, stroop test.

El impacto oculto de la disfunción del suelo pélvico en la participación, el rendimiento y el bienestar de las mujeres deportistas

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Introdução/Introduccion

La disfunción del suelo pélvico (DSP), que incluye la incontinencia urinaria (IU), el prolapso de órganos pélvicos (POP) y la incontinencia anal (IA), es cada vez más reconocida entre las mujeres deportistas. Sin embargo, sus consecuencias sobre el rendimiento, la participación y el bienestar siguen estando subestimadas. Esta revisión paraguas tuvo como objetivo sintetizar la prevalencia, el impacto percibido, las adaptaciones conductuales, las consecuencias psicológicas y las implicaciones sobre el rendimiento de la DSP en mujeres físicamente activas y deportistas. Un objetivo secundario fue explorar el conocimiento, las percepciones y la gestión de los síntomas de DSP por parte de las propias atletas.

Métodos/Metodologia

Se realizó una búsqueda exhaustiva en PubMed, Scopus, Web of Science y la Cochrane Library siguiendo las directrices PRISMA. Se incluyeron revisiones que abordaran mujeres adultas con DSP autoinformada o diagnosticada (incontinencia urinaria, prolapso de órganos pélvicos o incontinencia anal) en el contexto del ejercicio, el deporte o la actividad física. Se consideraron tanto mujeres deportistas como activas. Los desenlaces extraídos incluyeron la presencia de DSP, el impacto sobre la participación y el rendimiento, modificaciones conductuales, efectos psicológicos y nivel de conocimiento o tratamiento recibido. Se excluyeron revisiones centradas únicamente en resultados anatómicos o quirúrgicos o en poblaciones no deportistas. La calidad metodológica se evaluó mediante la herramienta AMSTAR2.

Resultados e Conclusões/Resultados y Conclusiones

Se incluyeron diecisiete revisiones sistemáticas que abarcan 33 estudios primarios únicos, con una muestra combinada de 22,662 mujeres deportistas, tanto de nivel élite como recreacional. Diez estudios (30.3%) fueron citados en múltiples revisiones, lo que refleja un solapamiento moderado en la base de evidencia y destaca contribuciones recurrentes en la literatura. Hasta el 72% de las mujeres modificaron o redujeron su actividad, y el 47% informó haber dejado de hacer ejercicio debido a los síntomas. La DSP también comprometió el rendimiento: las atletas evitaban tareas de alta intensidad como saltos, acrobacias o levantamiento de peso, lo que derivaba en alteraciones biomecánicas, reducción de la intensidad o abandono del entrenamiento. Entre los efectos psicosociales se reportaron vergüenza, ansiedad y subregistro, con más del 60% evitando comunicar los síntomas. A pesar de ello, solo entre el 10% y el 20% buscó tratamiento, y el

conocimiento sobre la salud del suelo pélvico y el entrenamiento de la musculatura del suelo pélvico (PFMT, por sus siglas en inglés) era limitado. La DSP afecta sustancialmente a las mujeres deportistas, limitando tanto la participación como el rendimiento, y sigue siendo poco reconocida y tratada. Aumentar la concienciación, implementar cribados sistemáticos y ofrecer apoyo integrado en salud pélvica son esenciales para proteger el bienestar de las atletas y prolongar su trayectoria competitiva. Más allá de la educación general, la evidencia actual respalda el entrenamiento específico de la musculatura del suelo pélvico como intervención central. Además, la preparación del suelo pélvico—mediante reacondicionamiento estructurado y programas de fuerza individualizados que respeten la tolerancia a la carga—resulta clave para reincorporar de forma segura actividades de alto impacto y fuerza, y favorecer el retorno óptimo al juego en todos los niveles y etapas de la vida.

Keywords: Suelo pélvico, mujeres deportistas, hábitos deportivos, rendimiento deportivo

Nutrition and Taekwondo: Mapping Scientific Trends

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Introdução/Introduccion

Sports and exercise nutrition is a new branch of nutrition science that combines the principles of nutrition with physical activity to improve athletic performance and help prevent long-term disease. This science, studies the role of nutrients, supplements and nutritional strategies in improving physical performance, recovery and health of athletes. Taekwondo, as an Olympic combat sport with characteristics of speed, explosive power, and endurance, requires targeted nutritional support to achieve optimal performance. Taekwondo is mainly an anaerobic activity though it also relies notably on aerobic energy pathways.

Métodos/Metodologia

This review, using Scopus searches, attempted to identify and analyze the prevailing trends and patterns in research related to nutrition and taekwondo. The focus was on articles published in the past 20 years (2005–2025), and selection criteria included direct relevance to taekwondo and nutritional interventions or topics. After an initial data review, 83 articles were selected and included in the final analysis.

Resultados e Conclusões/Resultados y Conclusiones

Based on the findings, for example, in the thematic map, 'muscle damage' can be mentioned as a motor theme, 'high-intensity training' as a niche theme, 'ergogenic aids' as an emerging or declining theme, and 'Taekwondo' as a basic theme. Also, the 9 most frequently repeated words in the authors' keywords section were taekwondo, martial arts, combat sports, athletes, performance, ergogenic aid, exercise, sports nutrition, weight loss. These words had 5 or more repetitions. Reviewing these scientific trends can help to better understand the areas of high application. Identifying research trends that are recurrent and important will help to better plan future studies and design more effective interventions. Also, this type of review can lead to the integration of scientific findings into practical programs for coaches and athletes at professional levels. The ultimate goal of this review is to provide an overview of the direction of research in this area and emphasize the need for more comprehensive and practical studies in the future.

Keywords: Sports Nutrition, Taekwondo, Dietary Supplements, Performance Enhancement, Research Trends

Os Efeitos do Aquecimento na Performance Muscular e no Treino de Força: Revisão Sistemática

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Introdução/Introduccion

Os efeitos do aquecimento para a performance desportiva estão bem estabelecidos (McGowan et al., 2015). No entanto, a sua pertinência em contexto de treino de força muscular é ainda ambígua dada há escassez de investigações de qualidade realizadas neste âmbito (Gil et al., 2019). Este estudo pretendeu investigar, de maneira sistemática, quais os efeitos da prática de diferentes protocolos de aquecimento na performance muscular mediante sessões de treino de força.

Métodos/Metodologia

Este estudo foi realizado segundo as recomendações da "Preferred Reporting Items for Systematic Reviews and Meta-Analysis" aplicada às Ciências do Desporto (PRISMA) (Rico-González et al., 2022). A pesquisa foi realizada em duas bases de dados (PubMed e Google Scholar). Os critérios de elegibilidade foram os seguintes: estudos transversais; população saudável e com experiência em treino de força; intervenção mediante aquecimento ativo; avaliar alterações da performance muscular em exercícios tradicionais de treino de força; inclusão de protocolos de aquecimento com variáveis distintas e/ou grupo de controlo. Quatorze estudos foram incluídos para efeito de revisão.

Resultados e Conclusões/Resultados y Conclusiones

Ambos protocolos de aquecimento compostos por componentes gerais e/ou específicas produzem efeitos benéficos na performance muscular e na capacidade de produção de força muscular em treinos de força. Ainda assim, o uso exclusivo de componentes específicas parece ser suficiente para gerar os efeitos pretendidos. Contrariamente, o uso de alongamentos deve ser evitado devido ao seu efeito negativo na capacidade de produção de força muscular neste contexto.

Keywords: Efeitos do aquecimento; Aquecimento; Treino de força; Aquecimento ativo.

Impacto de la carga semanal de entrenamiento y la carga del partido sobre la fatiga neuromuscular al día siguiente en futbolistas profesionales

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Introdução/Introduccion

Los futbolistas de élite afrontan calendarios altamente congestionados, lo que incrementa el riesgo de fatiga neuromuscular, pudiendo perjudicar el rendimiento y aumentar la probabilidad de lesión. El monitoreo efectivo de la fatiga muscular específica es crucial; sin embargo, muchas pruebas tradicionales no detectan cambios sutiles. Las evaluaciones específicas de fuerza muscular, como las pruebas excéntricas de los isquiotibiales y la fuerza de los aductores de cadera, proporcionan indicadores directos de fatiga y riesgo de lesión. Este estudio busca determinar cómo las cargas semanales de entrenamiento y las cargas agudas de los partidos afectan la función neuromuscular al día siguiente.

Métodos/Metodologia

Participantes: Veinticuatro futbolistas profesionales masculinos de un mismo club de élite (edad media: 26,5 ± 4,5 años; altura: 181 ± 6 cm; masa corporal: 77,3 ± 7,8 kg) fueron monitoreados durante 15 semanas competitivas no consecutivas. Los jugadores representaban diversas posiciones en el campo, excluyendo porteros por sus demandas físicas específicas. Todos los atletas estaban habituados a evaluaciones regulares del rendimiento neuromuscular como parte de sus rutinas de entrenamiento. Diseño del estudio y recolección de datos: Se utilizó un diseño observacional longitudinal. La carga externa semanal de los jugadores durante actividades de entrenamiento y partidos fue registrada mediante unidades de posicionamiento global (GPS, Catapult Sports, 10 Hz), integradas con acelerómetros triaxiales. Las métricas recopiladas incluyeron distancia total recorrida, distancia a alta intensidad (>20 km/h), distancia en sprint (>25 km/h), número de sprints, acciones de alta intensidad, aceleraciones (>2 $m \cdot s^{-2}$) y desaceleraciones (<–2 $m \cdot s^{-2}$). Los datos se procesaron mediante el software del fabricante (Catapult OpenField), garantizando prácticas de medición consistentes. Evaluación de la fatiga neuromuscular: La función neuromuscular fue evaluada aproximadamente entre 12 y 18 horas después de cada partido mediante cuatro pruebas específicas: Ejercicio Nórdico de Isquiotibiales (NHE): Se midió la fuerza excéntrica de los isquiotibiales utilizando NordBord (Vald Performance, Australia), registrando la fuerza bilateral promedio en tres intentos. Test Isométrico en posición prono para isquiotibiales: Fuerza isométrica de isquiotibiales medida en posición prono, con rodilla extendida (NordBord, Vald Performance), registrando la fuerza bilateral promedio en dos intentos máximos de 5 segundos. Tests de Fuerza Isométrica para Aductores y Abductores de Cadera: Usando el ForceFrame (Vald Performance), los atletas realizaron compresiones bilaterales

isométricas (aducción/abducción) con la cadera flexionada a 45°. Se registró la fuerza bilateral promedio de dos intentos. Análisis estadístico: Inicialmente, los datos faltantes (7–23% de las observaciones) fueron imputados mediante la técnica de imputación múltiple por ecuaciones encadenadas (MICE). Se aplicó un Análisis de Componentes Principales (PCA) para reducir la dimensionalidad de las variables correlacionadas obtenidas del GPS, creando indicadores compuestos de carga de entrenamiento y de partido. Posteriormente, se realizaron Modelos Lineales Mixtos (LMM) utilizando las métricas derivadas del PCA (Training PC1, Match PC1 y Match PC2) como predictores fijos, e incluyendo la identidad del jugador como intercepto aleatorio. Estos modelos evaluaron el impacto de las cargas sobre los resultados de fuerza neuromuscular al día siguiente, determinando la significación estadística mediante intervalos de confianza del 95% y valores p (considerando significativos valores $p < 0,05$).

Resultados e Conclusões/Resultados y Conclusiones

Una mayor carga de partido redujo significativamente la fuerza excéntrica de los isquiotibiales medida mediante el Ejercicio Nórdico ($\beta = –5.12$ N por cada incremento de una desviación estándar; $p = 0.046$), indicando fatiga aguda en estos músculos tras los partidos. Por otro lado, la carga semanal acumulada en entrenamientos tuvo un efecto mínimo inmediato sobre los resultados neuromusculares (todos los valores $p > 0.3$), lo que sugiere una gestión efectiva de la carga durante la semana de entrenamiento. De manera interesante, los partidos caracterizados por una mayor proporción de actividades de sprint aumentaron ligeramente la fuerza de los aductores de cadera al día siguiente ($\beta = +11.68$ N; $p = 0.046$), destacando una respuesta muscular específica que requiere más investigación. Este estudio evidencia que la carga de partido influye significativamente en la reducción de la fuerza excéntrica de los isquiotibiales al día siguiente, resaltando así la importancia de implementar estrategias específicas de recuperación tras partidos intensos. En cambio, la carga semanal de entrenamiento no mostró efectos neuromusculares inmediatos significativos, lo cual indica una adecuada gestión del volumen e intensidad de entrenamiento. El Ejercicio Nórdico se presenta como un indicador particularmente sensible para detectar fatiga inducida por partidos. Por tanto, entrenadores y preparadores físicos deberían utilizar regularmente este tipo de evaluaciones para optimizar los protocolos de recuperación, mejorar el rendimiento deportivo y reducir el riesgo de lesiones en futbolistas de élite.

Keywords: Carga de entrenamiento; carga de partido; fatiga neuromuscular; fuerza de isquiotibiales; aductores; abductores; monitorización; fútbol.

¿Podría la fuerza isocinética estar modulada por el ciclo menstrual en mujeres deportistas?

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Introdução/Introduccion

Las fluctuaciones hormonales que se producen a lo largo de las distintas fases del ciclo menstrual (FCM), en particular las relacionadas con la producción de fuerza muscular y el metabolismo, como la hormona foliculoestimulante (FSH) y la hormona luteinizante (LH), podrían influir en el rendimiento neuromuscular de las mujeres. Comprender el impacto del ciclo menstrual en el potencial neuromuscular de las deportistas resulta fundamental, ya que podría condicionar su respuesta y adaptación a los estímulos del entrenamiento. Considerando que la evaluación isocinética constituye el método de referencia para la medición del rendimiento neuromuscular, el objetivo de esta revisión sistemática fue analizar el efecto de las distintas FCM sobre la fuerza isocinética en deportistas femeninas.

Métodos/Metodologia

Esta revisión sistemática se llevó a cabo siguiendo las directrices establecidas en la declaración PRISMA. Para ello, se realizó una búsqueda bibliográfica en las bases de datos PubMed y Web of Science, utilizando términos clave relacionados con cada uno de los componentes del esquema PICO (deportistas femeninas – comparación entre diferentes FCM – fuerza isocinética), conectados mediante operadores booleanos.

Resultados e Conclusões/Resultados y Conclusiones

Tras eliminar los duplicados (n=2443) y descartar 4591 estudios por no estar relacionados con la temática, se identificaron 198 artículos como potencialmente elegibles. No obstante, al aplicar los criterios de inclusión, solo 9 estudios analizaron específicamente el impacto de las FCM. Las velocidades isocinéticas evaluadas con mayor frecuencia fueron 60º/s (8 estudios), seguidas por 180º/s (2 estudios), aunque también se analizaron otras velocidades (30º/s en 2 estudios, y 90º/s, 240º/s y 300º/s en otros). Además, 2 estudios evaluaron la resistencia muscular. Los principales hallazgos de esta revisión indican que durante la fase ovulatoria podría producirse un aumento de la fuerza

isocinética máxima a velocidades superiores a 60º/s, en comparación con otras fases del ciclo. Por el contrario, la fase folicular temprana podría asociarse a un menor rendimiento en comparación con las fases ovulatoria y lútea. En cuanto a la resistencia muscular, no se ha observado un efecto significativo del ciclo menstrual. Las velocidades isocinéticas bajas y moderadas implican un reclutamiento máximo de fibras musculares tipo I y tipo II. Por tanto, es posible que los niveles elevados de FSH y LH durante la ovulación favorezcan la contracción muscular, y que dichas velocidades (bajas/moderadas) sean más sensibles para detectar efectos estadísticamente significativos del impacto del ciclo menstrual sobre el rendimiento neuromuscular, en comparación con velocidades más altas que implican un reclutamiento más selectivo de fibras tipo II.

Keywords: Deportista; Ejercicio físico; Género; Neuromuscular; Entrenamiento de fuerza; Femenino

Estudio de los goles anotados durante el Mundial de Fútbol Femenino 2023

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Introdução/Introduccion

Introducción. Aunque el Fútbol Femenino se ha convertido en el nuevo fenómeno deportivo (Soroka, 2017), aún son escasas las investigaciones sobre el comportamiento técnico, táctico, físico y en función de las diferentes variables contextuales (Harkness-Armstrong et al., 2022). La frecuencia de los goles anotados es una variable ampliamente estudiada en el Fútbol Masculino (Çobanoğlu, 2019; Rance, 2023; Yolgörmez & Tütüncü, 2023). En el Fútbol Femenino, Armatas et al. (2007) estudiaron la frecuencia de los goles realizados desde la segunda edición del Mundial de Fútbol Femenino (MFF) realizada en Suecia en 1995, hasta la cuarta edición en Estados Unidos en el 2003. Registrar los goles realizados en un mundial de fútbol, permitiría identificar intervalos de tiempo en los que se realizaron mayor número de anotaciones, ya sea para aprovechar la ventaja deportiva o para disminuir la posibilidad de que una de estas acciones ocurra en un periodo específico. Por esta razón, y considerando que este tipo de análisis no se ha realizado en ediciones más recientes de MFF, el objetivo de este trabajo fue analizar la frecuencia de goles anotados en el MFF 2023.

Métodos/Metodologia

Metodología. Se analizaron las anotaciones realizadas en los 64 partidos de la novena edición de la Copa Mundial Femenina 2023. Los datos fueron tomados de la página oficial de la FIFA (FIFA, 2023b). Dentro de las variables independientes se consideraron los intervalo de tiempo de 15 min y como variable dependiente los goles realizados. Posterior a la toma de datos, se evalúo la confiabilidad intra-observador (>.932, coeficiente de Kappa= muy buenos; ICC= acuerdos altos) (Altman, 1991; Vincent, 1999). La confiabilidad inter-observador, fue asumida al tratarse de datos provenientes de la FIFA, quienes ya cuentan con un procedimiento para garantizar su fiabilidad (FIFA, 2023a). Además, se realizó estadística descriptiva (frecuencia y porcentajes), por medio del software Jamovi 2.4.7 (R Core Team, 2022; The Jamovi Project, 2023).

Resultados e Conclusões/Resultados y Conclusiones

Resultados y Discusión. Tras analizar la distribución de goles en períodos de 15 minutos, se observó que en el primer tiempo el periodo de mayor anotación se produjo entre los minutos 16-30 (28 goles, 17.07%), mientras que en el segundo tiempo fue el período entre los 61-75 min (26 goles, 15.85%). Además, el único gol realizado en el tiempo extra

ocurrió entre los 106-120 min (0.61%). Los resultados de este trabajo y específicamente el periodo crítico del primer tiempo, no coincide con el reportado en la Liga Francesa e Inglesa Femenina, y en el Mundial de Fútbol Masculino 2022, pues el periodo crítico de estas competiciones se presentó entre los 30-45 min. Sin embargo, el periodo crítico del segundo tiempo del MFF 2023, sí coincide con el registrado en el Mundial de Fútbol Masculino 2022, aunque no coincide con el de las Ligas de Fútbol Femenino Europeo, pues su periodo crítico se presentó entre los 45-60 min, superando al intervalo identificado en este trabajo solamente por un gol (Mesquita et al., 2023; Yolgörmez & Tütüncü, 2023). Conclusiones. Aunque estos hallazgos revelaron dos periodos críticos de 15 min durante los partidos del MFF 2023 (16-30 min y 61-75 min), se puede concluir que la dinámica de las anotaciones tiende a diferir en función de las diferentes competencias de fútbol, probablemente debido a factores de estilo de juego, tipos de competencia, filosofía del club y a componentes técnicos, tácticos y físicos. Por lo cual, se recomienda identificar la frecuencia de goles en función de cada competencia.

Keywords: Frecuencias, Goles, Mundial de Fútbol Femenino

PREVALENCIA DE LA INCONTINENCIA URINARIA EN ATLETAS FEMENINAS: REVISIÓN SISTEMÁTICA

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Introdução/Introduccion

La incontinencia urinaria (IU), definida como cualquier pérdida involuntaria de orina (Teixeira et al., 2018), representa un problema frecuente en mujeres, con una prevalencia estimada entre el 10% y el 55% según diversos factores individuales y contextuales (Eliasson, Larsson, Mattsson, et al., 2002). Esta condición tiende a manifestarse con mayor frecuencia en mujeres que practican disciplinas deportivas de alto impacto, debido al incremento de la presión intraabdominal generado durante el ejercicio (Bo, 2004). A pesar de su elevada incidencia, la IU continúa siendo un tema infraestimado en el ámbito deportivo, afectando tanto a la salud como al rendimiento de las atletas.

Métodos/Metodologia

Se llevó a cabo una revisión sistemática en las bases de datos PubMed, Web Of Science y Scoupus siguiendo las directrices PRISMA®. Se incluyeron estudios publicados desde el año 2000 que cumplieran con los siguientes criterios: (I) participación de mujeres deportistas de entre 18 y 60 años, (ii) evaluación mediante cuestionarios específicos de IU o pruebas clínicas de función del suelo pélvico; (iii) análisis de variables asociadas como la modalidad deportiva. Se excluyeron estudios realizados en mujeres embarazadas, investigaciones centradas exclusivamente en otras disfunciones pélvicas, artículos no disponibles en texto completo y publicaciones no originales como tesis, libros o resúmenes de congreso. La calidad metodológica se valoró utilizando la escala PEDro.

Resultados e Conclusões/Resultados y Conclusiones

Tras aplicar los criterios de selección, se incluyeron 6 estudios en la revisión final, a partir de un total de 17 artículos identificados. Todos utilizaron cuestionarios observacionales para evaluar la presencia de síntomas de IU. Los resultados indican una mayor prevalencia de IU en mujeres que practican deportes de alto impacto, como el atletismo, el trampolín o la halterofilia, en comparación con modalidades de menor impacto. Además, algunos estudios sugieren una posible relación entre la intensidad del entrenamiento y la gravedad de los síntomas, aunque se requieren más investigaciones para confirmar esta asociación. La IU es una condición frecuente en mujeres deportistas, especialmente en aquellas que practican disciplinas de alto impacto. Pese a su elevada prevalencia, la IU sigue siendo un problema poco visibilizado y abordado en el ámbito deportivo. Es imprescindible fomentar la detección precoz, la educación sobre salud del

suelo pélvico y el desarrollo de estrategias preventivas, con el fin de preservar tanto la salud como el rendimiento de las atletas.

Keywords: Disfunción urinaria, Presión abdominal, Salud perineal

Análisis de las diferencias de género en la percepción y satisfacción del uso de Edpuzzle para el entrenamiento de fuerza-resistencia en adolescentes de Educación Secundaria Obligatoria

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Introdução/Introduccion

El número de adolescentes que alcanza las recomendaciones establecidas por la Organización Mundial de la Salud en cuanto al entrenamiento de fuerza-resistencia es muy reducido. Además, a esto se suma que el tiempo dedicado a este tipo de contenidos en las clases de educación física es escaso. Por este motivo, se están desarrollando intervenciones que promueven el entrenamiento de fuerza-resistencia realizadas en horario extraescolar, pero se desconoce cuál es la percepción del alumnado que las utiliza y si esto afecta a la adherencia a la misma. Por este motivo, el objetivo del estudio fue conocer la opinión de los hombres y mujeres adolescentes en cuanto a la satisfacción y utilidad de un programa de entrenamiento de fuerza-resistencia realizado en horario extraescolar a través de la plataforma Edpuzzle

Métodos/Metodologia

Se llevó a cabo un ensayo controlado aleatorizado de doce semanas que consistió en una intervención online de fuerza-resistencia, realizada fuera del horario escolar, a través de la plataforma Edpuzzle. Las sesiones incluyeron ejercicios dirigidos a los principales grupos musculares y su duración aumentó progresivamente de 35 a 60 minutos a lo largo del programa. En total, participaron 52 adolescentes (edad media: 16.09±0.98 años; 33 mujeres y 19 hombres). Al finalizar la intervención, los participantes cumplimentaron una escala de valoración de la plataforma Edpuzzle, obteniendo puntuación en las dimensiones de “uso” y “satisfacción”.

Resultados e Conclusões/Resultados y Conclusiones

La puntuación promedio de “uso” de Edpuzzle fue de 2.91±1.63 para los hombres y de 3.57±0.92 para las mujeres, existiendo diferencias significativas entre ambos (diferencia de medias: -0.65; p=0.045). De igual forma, la puntuación promedio de los hombres en “satisfacción” fue de 2.95±1.58, mientras que en las mujeres fue de 3.65±0.98, existiendo diferencias significativas entre ambos grupos (diferencia de medias: -0.69; p=0.037). En cuanto a los motivos para no completar la intervención, la mayor parte de las mujeres destacaron que no quisieron hacer uso de la plataforma (82.0%), mientras que los hombres, además de no querer (51.1%), no se sintieron atraídos (20.0%) y no les interesaba lo suficiente la asignatura de educación física (13.3%). Por tanto, se puede concluir que, a pesar de que las mujeres valoraron mejor la plataforma Edpuzzle, no fue

suficiente para que completasen la intervención de fuerza-resistencia en su totalidad, mientras que los hombres no se sintieron atraídos por este tipo de intervención.

Keywords: Adolescentes; Edpuzzle; Fuerza-resistencia.

Impacto del uso de Edpuzzle para el entrenamiento de fuerza-resistencia sobre las variables psicológicas de los adolescentes de Educación Secundaria Obligatoria

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Introdução/Introduccion

El entrenamiento de fuerza-resistencia no solo conlleva mejoras en la salud física y la composición corporal de los adolescentes, sino que también ha mostrado un impacto positivo sobre el estado psicológico de esta población. Sin embargo, son pocos los adolescentes que cumplen con las recomendaciones establecidas por la Organización Mundial de la Salud para el entrenamiento de fuerza-resistencia, lo que conlleva la pérdida de los beneficios potenciales que este tipo de entrenamiento tiene sobre la salud integral. Por este motivo, el objetivo del estudio fue analizar el impacto de una intervención extraescolar de fuerza-resistencia utilizando la plataforma Edpuzzle sobre el estado psicológico de los adolescentes.

Métodos/Metodologia

Se llevó a cabo un ensayo controlado aleatorizado de doce semanas de duración. Un total de 107 adolescentes (edad promedio: 16.09±0.98 años; 62 mujeres y 45 hombres), distribuidos de forma aleatoria entre un grupo experimental (GE; n=52) y un grupo control (GC; n=55) participaron en la investigación. Durante doce semanas, los participantes del GE realizaron en el horario extraescolar una intervención online de fuerza-resistencia a través de la plataforma Edpuzzle. Las sesiones incluyeron ejercicios dirigidos a los principales grupos musculares y su duración aumentó progresivamente de 35 a 60 minutos a lo largo del programa. Las necesidades psicológicas básicas y la satisfacción con la vida fueron analizadas antes y después de la intervención.

Resultados e Conclusões/Resultados y Conclusiones

No se hallaron diferencias significativas en la competencia (GE: p=0.876; GC: p=0.247), la autonomía (GE: p=0.756; GC: p=0.320), la relación social (GE: p=0.886; GC: p=0.836), ni en la satisfacción con la vida (GE: p=0.689; GC: p=0.468) de ninguno de los grupos del estudio. Por tanto, se puede concluir que una intervención de fuerza-resistencia promovida desde la asignatura de educación física y realizada en el horario extraescolar por medio de la plataforma Edpuzzle no parece tener un impacto significativo sobre el estado psicológico de los adolescentes.

Keywords: Adolescentes; Edpuzzle; Estado psicológico.

High-Intensity Interval Training (Tabata) and Its Impact on Muscular Strength in Dancers and Sedentary Individual

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Introdução/Introduccion

Numerous authors recognise the importance of good physical condition in dancers, stating that they must prepare themselves physiologically (Angiogi, Metsios, Twitchett, Koutedakis and Wyon, 2009; Irvine, Redding and Rafferty, 2011 and Rodrigues-Krause, Krause and Reischak-Oliveira, 2015). In this sense, it should be noted that dance is a type of physical activity whose main instrument of work is the body itself and that is why good physical conditioning is necessary. McCormack et al. (2019) grouped in order of importance the basic physical characteristics, highlighting strength as one of the most important in the physical condition of dancers. Elizondo (2022) concludes that it is necessary to implement training methods to improve strength in dancers as this quality is essential in any physical activity (Koutedakis et al., 2005; Suchomel et al., 2016). In the last decade, high intensity interval training (HIIT) has gained presence in the preparation of dancers, being the Tabata method one of the most studied (Tabata et al., 1996).

Métodos/Metodologia

A pre-post experimental study was conducted to analyze the effects of a HIIT protocol (Tabata method) on the physical condition of dancers. A total of 21 participants were divided into two groups: an experimental group (dancers; n=11) and a control group (sedentary individuals; n=10). Both groups were assessed at baseline and after 10 weeks of training in various strength variables, including handgrip (dominant and non-dominant), countermovement jump (CMJ) height, and relative CMJ power.

Resultados e Conclusões/Resultados y Conclusiones

After the 10-week intervention, no statistically significant changes were observed in handgrip strength or CMJ height ($p > 0.05$). However, a significant time × group interaction effect was found for relative CMJ power ($F = 5.996$; $p = 0.026$; $\eta^2p = 0.273$), indicating an improvement in the dancer group. These findings suggest that HIIT training may be an effective strategy for enhancing specific aspects of physical performance in dancers, although further research is needed to confirm and expand upon these results.

Keywords: Fitness, strength, dancers, High Intensity Interval Training, Tabata method, sedentary people.

Protocolo Multidimensional para la Mejora de la Función en Pacientes con Tendinopatía Rotuliana

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Introdução/Introduccion

La tendinopatía rotuliana es una patología frecuente en deportes de salto y alta intensidad. Aunque el entrenamiento excéntrico y la terapia por ondas de choque son efectivos por separado, su combinación no ha sido suficientemente explorada. Este estudio analiza los efectos de un protocolo de rehabilitación multimodal sobre el dolor, el rendimiento neuromuscular y la composición corporal.

Métodos/Metodologia

Ensayo clínico aleatorizado con 29 deportistas diagnosticados con tendinopatía rotuliana. Se asignaron a un grupo intervención (entrenamiento excéntrico + estiramientos + ondas de choque) o a un grupo control (terapia placebo). Se evaluaron el dolor (VISA-P), salto vertical (CMJ), producción de potencia y composición corporal al inicio, a las 4 y a las 8 semanas.

Resultados e Conclusões/Resultados y Conclusiones

El grupo intervención mejoró significativamente en percepción del dolor y rendimiento en el salto CMJ. No se observaron cambios en la composición corporal. Se incrementó la potencia máxima sin alterar la relación carga-velocidad. Este protocolo multimodal es eficaz para mejorar la función en deportistas con tendinopatía rotuliana sin necesidad de interrumpir la actividad física.

Keywords: Tendinopatía rotuliana; entrenamiento excéntrico; terapia por ondas de choque; rehabilitación neuromuscular; readaptación

Indicadores de Salud Mental y Conductual en Atletas Turcos Retirados: Resultados Preliminares

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Introdução/Introduccion

Los deportes son fundamentales para mejorar y desarrollar la salud. La jubilación deportiva representa una transición ocupacional que conlleva cambios en muchos hábitos relacionados con la nutrición y el estilo de vida. Las modificaciones en la actividad física y las preferencias alimentarias pueden provocar diversos problemas, como un estilo de vida sedentario, estrés, depresión y ansiedad. Por esta razón, el proceso de finalización de la carrera en atletas de élite puede afectar negativamente el funcionamiento profesional y social futuro de estos individuos. Este estudio tiene como objetivo determinar el bienestar mental, la alimentación hedónica y los niveles de actividad física de atletas turcos retirados de diversas disciplinas.

Métodos/Metodologia

Este estudio transversal se realizó con atletas retirados (n=40) que practicaron deportes profesionales en diferentes disciplinas. Se les preguntó a los participantes sobre sus características sociodemográficas, datos relacionados con sus carreras deportivas profesionales y factores del estilo de vida. Además, se aplicaron el Cuestionario Internacional de Actividad Física - Versión Corta (IPAQ-SV), el Inventario de Depresión de Beck - Forma Corta (BDI-SF) y el Cuestionario de Tres Factores de la Conducta Alimentaria (TFEQ-R18). Los análisis estadísticos se realizaron con el software Jamovi.

Resultados e Conclusões/Resultados y Conclusiones

La media de edad, peso y altura de los participantes femeninos (10.0%) y masculinos (90.0%) fue de 58.5 ± 15.0 años, 86.5 ± 16.8 kg y 179.0 ± 5.8 cm, respectivamente. Casi la mitad de los participantes poseía al menos un título de licenciatura. Aunque el 30.0% se había retirado del deporte, continuaban trabajando. El 63.2% de los sujetos reportaron no fumar nunca, y el 46.9% indicaron no consumir alcohol nunca. Según el IPAQ-SV, el 34.5% de los participantes eran inactivos, el 34.5% tenían una actividad mínima, y el 31.0% estaban suficientemente activos. El BDI-SF mostró que el 25.0% de los participantes presentaban síntomas leves de depresión y el 7.5% síntomas moderados. Según los resultados del TFEQ-R18, las puntuaciones de restricción cognitiva, ingesta descontrolada y alimentación emocional fueron 54.4 ± 16.9, 63.3 ± 16.3 y 64.7 ± 28.3, respectivamente. Estos hallazgos resaltan la necesidad de futuras investigaciones

centradas en la relación entre el manejo de los síntomas depresivos y las actitudes alimentarias en esta población.

Keywords: atleta, depresión, alimentación, actividad física, estilo de vida

Efectos del Ejercicio Físico en la Insulina en Cáncer de Próstata

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Introdução/Introduccion

El cáncer de próstata se posiciona como el segundo más prevalente y el más común entre los hombres. Su incidencia ha alcanzado los 1.5 millones de nuevos casos a nivel mundial. Independientemente del tratamiento elegido, los sobrevivientes de cáncer de próstata suelen enfrentar una alta morbilidad, tanto por la enfermedad en sí como por sus tratamientos, en especial la terapia de privación androgénica (ADT, por sus siglas en inglés). Los efectos adversos de la ADT pueden afectar considerablemente la calidad de vida del paciente, manifestándose en incontinencia urinaria, disfunción sexual o diarrea crónica, entre otros. Además, los hombres con cáncer de próstata pueden experimentar un impacto psicológico, sintiéndose más vulnerables debido a la pérdida de expresiones asociadas con la masculinidad.

Métodos/Metodologia

Para llevar a cabo esta revisión sistemática y metaanálisis, se siguieron las directrices PRISMA. Se incluyeron los artículos que cumplieron con los siguientes criterios: (a) los participantes padecían cáncer de próstata, (b) la intervención consistía en algún tipo de ejercicio físico, (c) se reportaban efectos sobre los niveles de insulina, (d) el diseño incluía un grupo de control, y (e) los participantes fueron asignados aleatoriamente a grupos de ejercicio o control. Los criterios de exclusión fueron: (a) artículos no escritos en inglés; (b) consensos, revisiones, guías clínicas, resúmenes de congresos y protocolos o diseños de estudio; (c) los resultados de pacientes con cáncer de próstata no estaban reportados por separado; (d) estudios de intervenciones agudas; (e) artículos con datos duplicados de otro estudio ya incluido; (f) artículos no disponibles; (g) estudios con intervenciones orientadas a la prevención del cáncer; y (h) estudios con grupo control compuesto por hombres sanos. El análisis estadístico del metaanálisis se realizó utilizando el software Review Manager (RevMan) versión 5.4.

Resultados e Conclusões/Resultados y Conclusiones

En total, se incluyeron seis estudios en el metaanálisis, con 148 participantes en los grupos experimentales y 139 en los grupos de control. Los estudios se clasificaron en dos tipos de intervención: ejercicio de resistencia y ejercicio combinado. En el subgrupo de ejercicio de resistencia, la diferencia de medias estandarizada (SMD) fue de -0.62 [IC

95%: -2.69 a 1.44], con una heterogeneidad considerable (I^2 = 93%). En el subgrupo de ejercicio combinado, se observó un efecto significativo (valor p = 0.03) con una SMD agrupada de -0.31 [IC 95%: -0.59 a -0.03], sin heterogeneidad aparente (I^2 = 0%). El efecto global combinado de todos los estudios fue de -0.35 [IC 95%: -1.00 a 0.31], con una heterogeneidad elevada (I^2 = 85%). No se detectaron diferencias significativas entre subgrupos (χ^2 = 0.09, gl = 1, p = 0.77; I^2 = 0%). No se reportaron efectos negativos en esta revisión; por tanto, se recomienda considerar el ejercicio físico como un componente clave en el tratamiento no farmacológico para hombres con cáncer de próstata. El ejercicio combinado demostró ser el más eficaz en este estudio. De hecho, combinar entrenamiento de resistencia con ejercicio aeróbico ha mostrado mejorar el metabolismo de la glucosa al aumentar la producción de insulina y favorecer la gluconeogénesis. Esto es especialmente relevante en pacientes oncológicos, donde la obesidad suele ser una comorbilidad frecuente, por lo que el ejercicio podría funcionar como un mecanismo preventivo. Además, dado que la ADT se asocia con el desarrollo de resistencia a la insulina, el incremento en los niveles de insulina y la mejora de su función contribuyen a mantener la glucosa dentro de rangos fisiológicos normales. Por ello, la práctica continua de ejercicio físico puede actuar como un regulador externo del metabolismo corporal, contrarrestando la disfunción inducida por el cáncer.

Keywords: Revisión sistemática y metaanálisis, pacientes con cáncer, ejercicio oncológico, metabolismo del cáncer, ensayos controlados aleatorizados.

Monitoreo de la carga de entrenamiento: análisis basado en GPS de la monotonía y la tensión en futbolistas profesionales titulares y suplentes a lo largo de una temporada completa

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Introdução/Introduccion

El fútbol es un deporte de equipo popular a nivel mundial que se caracteriza por altas demandas físicas y fisiológicas, lo que requiere la implementación de regímenes de entrenamiento estructurados y bien monitoreados durante toda la temporada competitiva. Este estudio tuvo como objetivo: (i) cuantificar los promedios semanales de monotonía de entrenamiento (TM) y tensión de entrenamiento (TS) en función de la frecuencia de aceleraciones (Acc) y desaceleraciones (Dec) durante una temporada completa; y (ii) examinar las diferencias entre titulares y no titulares en TM y TS semanales durante las fases de pretemporada y temporada.

Métodos/Metodologia

Diecinueve futbolistas profesionales de un equipo de la Premier League iraní (edad media: 28 ± 4,6 años; altura: 181,6 ± 5,8 cm; masa corporal: 74,5 ± 5,6 kg; IMC: 21,8 ± 1,0 kg/m2) participaron en este estudio de cohorte. Según su participación en partidos, los jugadores se clasificaron como titulares (n = 10) o suplentes (n = 9). Los datos se recopilaron durante un periodo de 43 semanas, incluyendo entrenamientos y partidos oficiales. Las métricas de actividad física se registraron mediante dispositivos de seguimiento GPS (GPSPORTS Systems Pty Ltd).

Resultados e Conclusões/Resultados y Conclusiones

No significant differences were observed in training strain (TS) between the two groups during the pre-season and end-season phases. However, TS values during these periods were higher compared to the early- and mid-season. During the early and mid-season, significant differences ($p < 0.05$) in TS were found between starters and non-starters across all zones. Hedge's g analysis indicated large to very large effect sizes, favoring the starters. Across all zones and for both training monotony (TM) and TS, non-starters exhibited greater percentage changes and higher coefficients of variation. TM patterns showed oscillations forming W-shaped trends throughout the season. These findings highlight that training loads during the early- and mid-season may be inadequate for the non-starter group. Coaches are advised to implement more tailored and individualized training programs to ensure optimal development and performance readiness for non-starters.

Keywords: aceleración; desaceleración; monitorización externa; periodización; rendimiento; GPS

Cuando la Fisiología también Juega: Influencia del Ciclo Menstrual en el Rendimiento de las Deportistas

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Introdução/Introduccion

Durante décadas, la investigación en medicina deportiva ha tomado como referencia al cuerpo masculino, ignorando las particularidades fisiológicas del femenino. Esta invisibilización ha generado una importante brecha de conocimiento sobre cómo el ciclo menstrual afecta el rendimiento de las deportistas. El presente estudio aborda esta carencia analizando la influencia de las distintas fases del ciclo menstrual en la carga de entrenamiento de jugadoras semiprofesionales de baloncesto.

Métodos/Metodologia

La muestra estuvo compuesta por 12 deportistas con ciclos menstruales regulares, sin uso reciente de anticonceptivos hormonales. A través de un diseño ecológico, se analizaron variables físicas y cardiovasculares sin alterar el entorno natural de entrenamiento. Los datos obtenidos permitieron identificar dos clústeres: uno correspondiente a las fases menstrual y lútea, caracterizado por menor variabilidad en cargas y mayor percepción de fatiga; y otro que abarca las fases proliferativa y ovulatoria, donde se observó mayor predisposición al esfuerzo intenso, aceleraciones y menor fatiga percibida.

Resultados e Conclusões/Resultados y Conclusiones

Los resultados respaldan estudios previos que asocian la ovulación con el aumento de estrógenos y mejor rendimiento, mientras que la menstruación se vincula a fatiga y riesgo de lesión, especialmente del ligamento cruzado anterior (LCA). La investigación concluye que la planificación del entrenamiento debe adaptarse a las fluctuaciones hormonales, permitiendo una gestión más eficiente del rendimiento y la prevención de lesiones. Este enfoque contribuye a una práctica deportiva más equitativa, basada en la evidencia y centrada en las necesidades reales de las mujeres atletas.

Keywords: ciclo menstrual, rendimiento deportivo, mujer atleta, entrenamiento personalizado.

VALOR DE MERCADO E DESEMPENHO ESPORTIVO NA SAUDI PRO LEAGUE: UMA ANÁLISE DOS ÚLTIMOS 10 ANOS

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Introdução/Introduccion

Introdução: Nos últimos anos, a Saudi Pro League passou por um processo de reestruturação impulsionado por elevados investimentos no futebol nacional. Esse movimento resultou em um aumento no valor de mercado dos clubes, refletindo mudanças na composição dos elencos e na atratividade da liga. Diante desse cenário, surgem discussões sobre como esses investimentos se traduzem em desempenho esportivo dentro de campo. Objetivo: Analisar a relação entre o valor de mercado dos clubes da Saudi Pro League e seu desempenho esportivo ao longo das temporadas de 2013/2014 a 2023/2024.

Métodos/Metodologia

Metodologia: O estudo analisou uma amostra de 180 clubes que participaram da Saudi Pro League® entre as temporadas de 2013/2014 e 2023/2024. Os dados foram coletados na plataforma Transfermarkt, amplamente reconhecida por fornecer estimativas de valor de mercado e estatísticas do futebol profissional. Foram consideradas informações sobre o valor de mercado dos clubes e suas respectivas pontuações finais em cada temporada. A normalidade dos dados foi avaliada pelo teste de Shapiro-Wilk. Devido à natureza não paramétrica das variáveis, utilizou-se a correlação de Spearman para investigar a relação entre o valor de mercado e o desempenho esportivo. Todas as análises foram conduzidas com nível de significância de 5%, utilizando o software GraphPad Prism, versão 8.01 (San Diego, CA, EUA).

Resultados e Conclusões/Resultados y Conclusiones

Resultados: Os resultados indicaram correlação positiva entre o valor de mercado dos clubes e sua pontuação final em oito das dez temporadas analisadas. As correlações variaram de moderadas a fortes, com destaque para as temporadas 2016/2017 (r = 0,91), 2022/2023 (r = 0,89) e 2023/2024 (r = 0,82), que apresentaram associações particularmente elevadas. Esses achados sugerem que, de modo geral, clubes com maior valor de mercado tendem a alcançar melhor desempenho na Saudi Pro League. Conclusão: Os resultados deste estudo indicam que, ao longo das temporadas analisadas,

clubes com maior valor de mercado tendem a obter melhor desempenho na Saudi Pro League. Essa associação reforça a influência dos investimentos financeiros nos resultados esportivos da competição.

Keywords: Desempenho esportivo. Investimento. Valor de mercado.

Worst-Case Scenarios de un torneo de baloncesto masculino profesional: estudio de caso

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Introdução/Introduccion

El análisis de las demandas medias en baloncesto profesional no refleja los picos de exigencia (Worst Case Scenarios, WCS) a los que se enfrentan los jugadores, pudiendo estos superar en hasta un 600% las medias habituales (Vázquez-Guerrero & Garcia, 2021).

Métodos/Metodologia

Este estudio analizó retrospectivamente dos partidos oficiales de un equipo de la primera división española, con 12 jugadores monitorizados mediante dispositivos inerciales. Se identificaron los tres WCS por jugador y partido en base a la velocidad máxima registrada en ventanas móviles de un minuto. Se realizaron análisis descriptivos, correlacionales y pruebas t para comparar condiciones.

Resultados e Conclusões/Resultados y Conclusiones

Se identificaron 63 WCS, con una velocidad media de 5.77±0.216 m/s (mín. 5.3 m/s; máx. 6.37 m/s). El 48% ocurrieron en el primer cuarto y el 77% en la primera parte del partido. El 21% sucedieron en los dos primeros minutos y el 32% en los cinco primeros. Destaca uno de los WCS que se produjo al inicio del partido. Dentro de cada cuarto, el 26% se concentró en los primeros dos minutos. Un 30% de los WCS reapareció tras tres minutos y un 17.5% tras dos. Además, el 32% se repitieron dos veces dentro de la misma ventana y el 13% tres veces. Se observó que a mayor número de repeticiones por ventana, mayor volumen y menor intensidad. Los WCS más intensos se produjeron al inicio del partido o de cada cuarto, siendo generalmente únicos. No se hallaron correlaciones con el tiempo total jugado por cada jugador. Tampoco hubo diferencias significativas entre semifinal y final, aunque se apreció una tendencia hacia mayor volumen en la final y mayor explosividad en la semifinal. Los jugadores deben estar preparados para afrontar demandas de máxima intensidad desde los primeros instantes de partido, así como para repetir esfuerzos de alto volumen en cortos periodos de recuperación. Estos hallazgos son fundamentales para planificar tareas de entrenamiento ajustadas tanto en intensidad como en volumen.

Keywords: Escenarios de Máxima Demanda, WCS, Hombres, Partido, Competición.

Efectos sobre la composición corporal de adolescentes activos e inactivos de una intervención con aplicaciones móviles cuentapasos

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Introdução/Introduccion

Los adolescentes presentan índices de sobrepeso y obesidad elevados, lo que afecta su salud. Las intervenciones con aplicaciones móviles parecen ser prometedoras para revertir esto, aunque se desconocen los efectos que provocan en función del nivel de actividad física previo. Por tanto, el objetivo del estudio fue analizar el efecto de una intervención con aplicaciones móviles cuentapasos promovida desde Educación Física sobre la composición corporal de adolescentes activos e inactivos.

Métodos/Metodologia

Participaron 430 adolescentes (edad media: 13.76±1.41 años) en un ensayo controlado aleatorizado de diez semanas. Los adolescentes fueron clasificados en activos e inactivos y asignados aleatoriamente al grupo experimental (GE) y control (GC). Los adolescentes del GE fueron asignados aleatoriamente a una de las aplicaciones siguientes: Pokémon Go, Strava, Pacer y MapMyWalk. La composición corporal se midió antes y después de la intervención.

Resultados e Conclusões/Resultados y Conclusiones

En los adolescentes inactivos del GE se halló un aumento en masa corporal ($p<0.001$), altura ($p<0.001$), índice de masa corporal (IMC) ($p=0.008$), perímetros del brazo y muslo corregido ($p<0.001$) y masa muscular ($p<0.001$), pero disminuyó la suma de los 3 pliegues cutáneos ($p=0.018$). Los adolescentes inactivos del GC aumentaron la masa corporal ($p=0.003$), IMC ($p=0.013$), perímetro del brazo corregido ($p=0.002$), perímetro de la pierna corregida ($p=0.015$) y masa muscular ($p=0.005$). Los adolescentes activos del GE aumentaron la masa corporal ($p<0.001$), altura ($p<0.001$), perímetros del brazo y muslo corregido ($p<0.001$) y masa muscular ($p<0.001$); mientras que la masa grasa ($p=0.028$) y la suma de los 3 pliegues cutáneos ($p=0.036$) disminuyeron tras la intervención. Los adolescentes activos del GC aumentaron la masa corporal ($p<0.001$), altura ($p<0.001$), IMC ($p<0.001$), perímetro del brazo corregido ($p<0.001$), perímetro de la pierna corregido ($p=0.029$) y masa muscular ($p=0.001$). Por tanto, se puede concluir que las aplicaciones móviles parecen una buena opción para modificar la composición corporal de los adolescentes, indistintamente de su nivel de actividad física previo.

Keywords: Adolescentes; Aplicaciones móviles cuentapasos; Composición corporal.

Influencia del nivel de actividad física de los adolescentes en la valoración de las aplicaciones móviles cuentapasos

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Introdução/Introduccion

Las aplicaciones móviles son consideradas herramientas útiles para promover la actividad física en la población adolescente. Sin embargo, tras las primeras semanas de uso, desaparece la novedad inicial y los adolescentes pierden adherencia hacia la intervención. Esto podría deberse al tipo de diseño que presentan estas aplicaciones y al nivel de actividad física previo de los adolescentes, pero no se conocen investigaciones previas al respecto. Por tanto, los objetivos del presente estudio fueron: a) analizar las diferencias en la valoración de las aplicaciones móviles según el nivel de actividad física previo de los adolescentes; y b) analizar las diferencias en la valoración de las aplicaciones móviles según la aplicación móvil utilizada.

Métodos/Metodologia

Un total de 240 adolescentes (edad media: 13.76±1.41 años) participaron en un estudio cuasi-experimental de diez semanas de duración. Los adolescentes fueron clasificados en activos e inactivos y utilizaron tres por veces por semanas en el horario extraescolar una de las siguientes aplicaciones móviles: Pokémon-Go, Pacer, Strava y MapMyWalk. El cuestionario de actividad física para adolescentes (PAQ-A) y la Escala de valoración de aplicaciones móviles en versión usuario (uMARS) fueron cumplimentados antes y después de la intervención.

Resultados e Conclusões/Resultados y Conclusiones

No se hallaron diferencias en la valoración de las aplicaciones móviles entre los adolescentes activos e inactivos en cuanto a compromiso (p=0.560-0.761), funcionalidad (p=0.566-0.977), estética (p=0.669-0.960), información (p=0.408-0.862), usabilidad (p=0.299-0.805) e impacto percibido (p=0.195-0.934). No se hallaron diferencias significativas según la aplicación utilizada en el grupo de adolescentes inactivos en compromiso (p=0.675), funcionalidad (p=0.223), estética (p=0.345), información (p=0.304), usabilidad (p=0.335) e impacto percibido (p=0.599), ni tampoco en el de activos en compromiso (p=0.972), funcionalidad (p=0.477), estética (p=0.622), información (p=0.255), usabilidad (p=0.163), impacto percibido (p=0.484). En

conclusión, la valoración realizada de las aplicaciones móviles cuentapasos no es diferente en función del nivel de actividad física de los adolescentes.

Keywords: Adolescentes; Aplicaciones móviles cuentapasos; Valoración.

CORRELAÇÕES ENTRE ASPECTOS FÍSICOS E TÉCNICOS EM JOGADORES DE FUTSAL SUB-10

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Introdução/Introduccion

O futsal é um esporte coletivo de invasão, praticado em quadra, que exige tomadas de decisão rápidas durante o jogo. O desempenho na modalidade é determinado pela interação de múltiplas dimensões, que englobam tanto as capacidades físicas quanto os fundamentos técnicos. Considerar isoladamente qualquer um desses elementos pode limitar o desenvolvimento dos atletas, sobretudo na fase de iniciação esportiva, em que se torna ainda mais relevante compreender os diferentes fatores que impactam o rendimento. Diante disso, este estudo teve como objetivo analisar as correlações entre variáveis físicas e técnicas em jogadores de futsal da categoria sub-10.

Métodos/Metodologia

Vinte e dois atletas (8,86 ± 0,35 anos de idade) realizaram avaliações físicas e técnicas em dois dias distintos, com intervalo de 48 horas entre as sessões. Foram mensuradas estatura, massa corporal, índice de massa corporal (IMC), salto vertical, corrida de 20 metros (C20), capacidade de mudança de direção (T-teste), além dos fundamentos técnicos de passe e condução de bola. A correlação de Pearson foi utilizada para avaliar a intensidade e a direção das relações lineares entre as variáveis, adotando-se nível de significância de $p<0,05$.

Resultados e Conclusões/Resultados y Conclusiones

Observou-se um padrão consistente de correlações significativas entre variáveis físicas e técnicas dos jogadores de futsal sub-10. Destaca-se a forte associação entre T-teste e C20 ($r = 0,9$), indicando que atletas com menor capacidade de mudança de direção tendem a apresentar pior desempenho na velocidade linear. Além disso, o T-teste apresentou correlação positiva com massa corporal ($r = 0,6$) e com IMC ($r = 0,6$), sugerindo que maiores valores de massa corporal podem impactar negativamente a capacidade de mudança de direção. A C20 também se correlacionou positivamente com estatura ($r = 0,5$), massa corporal ($r = 0,7$) e IMC ($r = 0,6$), apontando uma possível influência das características antropométricas sobre o desempenho na velocidade. Houve correlações negativas de salto vertical com C20 ($r = -0,7$) e com T-teste ($r = -0,6$), indicando que maior potência de membros inferiores está associada a melhor desempenho na corrida linear e na mudança de direção. O fato de o passe não apresentar correlações significativas sugere que este fundamento técnico, ao menos nessa faixa etária, é menos dependente dos atributos físicos avaliados. Esses achados reforçam a interdependência entre capacidades físicas e componentes técnicos na iniciação esportiva, evidenciando que o

desenvolvimento motor nessa faixa etária é multifatorial. A compreensão dessas interações contribui para otimizar o planejamento de treinamentos, abrangendo as demandas físicas e técnicas específicas do futsal infantil. Recomenda-se, ainda, o acompanhamento longitudinal desses atletas a fim de monitorar como tais correlações evoluem diante das mudanças maturacionais.

Keywords: desenvolvimento atlético, jovens atletas, treinamento esportivo.

Impacto de las fases del ciclo menstrual durante una prueba de ejercicio progresivo

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Introdução/Introduccion

A lo largo de las diferentes fases del ciclo menstrual (FCM) se produce una fluctuación de diversas hormonas, como la hormona luteinizante (LH) y la hormona folículoestimulante (FSH), que podrían influir en el metabolismo durante el ejercicio. Dado que la respuesta fisiológica al ejercicio induce adaptaciones específicas al entrenamiento, resulta fundamental conocer la influencia del FCM en dicha respuesta. La prueba de ejercicio progresivo es el estándar de oro para la evaluación del consumo máximo de oxígeno (VO_2máx), uno de los parámetros más sensibles de la condición física. Por ello, los y las deportistas de la mayoría de las disciplinas deportivas incluyen sesiones específicas para mejorarlo. En este contexto, el objetivo del presente estudio fue analizar el impacto de las distintas fases del ciclo menstrual durante una prueba de ejercicio progresivo.

Métodos/Metodologia

Esta revisión fue diseñada siguiendo los criterios PICO: i) Participantes: atletas femeninas; ii) Intervención: distintas fases del ciclo menstrual; iii) Comparación: fases folicular, ovulatoria y lútea; iv) Resultados: pruebas de ejercicio progresivo. Se utilizaron palabras clave relacionadas con los criterios PICO en una estrategia de búsqueda combinada con conectores booleanos en las bases de datos Web of Science y PubMed.

Resultados e Conclusões/Resultados y Conclusiones

Se identificaron 198 artículos como potencialmente relevantes tras descartar duplicados (n=2443) y estudios irrelevantes (n=4591). Nueve artículos cumplieron todos los criterios de inclusión y fueron seleccionados para esta revisión. Siete estudios analizaron procedimientos con cinta rodante, uno utilizó cicloergómetro y otro combinó ambos dispositivos. Los resultados sugieren un efecto poco significativo del FCM, aunque se observó un posible aumento en el tiempo hasta el agotamiento y en la velocidad alcanzada durante la fase folicular, en comparación con la fase lútea. Este pequeño incremento en el rendimiento máximo podría explicarse por una mayor contribución del metabolismo

de los carbohidratos al metabolismo energético, especialmente en condiciones que favorecen el metabolismo glucolítico (por ejemplo, temperaturas elevadas y humedad). Sin embargo, esta revisión sistemática concluye que el FCM no influye de manera significativa en el rendimiento físico de las atletas. No obstante, sesiones de entrenamiento interválico de alta intensidad, centradas en un predominio del metabolismo glucolítico, podrían resultar óptimas durante la fase folicular. Por tanto, una planificación del entrenamiento que modifique la carga interna según la fase del ciclo menstrual podría optimizar las adaptaciones al entrenamiento en atletas femeninas.

Keywords: Aeróbico; Atleta; Resistencia; Mujer; Deporte

EVALUACIÓN DE LA FUERZA ISOMÉTRICA MÁXIMA DE ABDUCCIÓN DE CADERA, REVISIÓN SISTEMÁTICA

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Introdução/Introduccion

En el ámbito de la evaluación deportiva, la medición de la fuerza isométrica máxima (FIM) mediante dinamometría manual (DM) se ha consolidado como una herramienta clave para profesionales clínicos, del deporte y de la investigación. Dentro de este contexto, la valoración de la fuerza de los músculos abductores de la cadera (ABDC) ha cobrado especial relevancia debido a su implicación en la prevención de lesiones, el rendimiento deportivo y la rehabilitación funcional. Sin embargo, no existe un consenso metodológico sobre la mejor posición del sujeto, la ubicación del DM, ni el tipo de dispositivo más adecuado para obtener medidas fiables y válidas. Además, la influencia del examinador ha sido identificada como un factor determinante, ya que su nivel de fuerza, experiencia y consistencia en la aplicación del dinamómetro puede afectar significativamente la precisión de la medición, especialmente cuando no se utilizan sistemas de fijación externos. El objetivo del estudio fue analizar y describir las características metodológicas de los protocolos utilizados para la evaluación de la FIM de la ABDC en adultos sanos y deportistas, con el fin de identificar sus ventajas, limitaciones y aplicaciones prácticas.

Métodos/Metodologia

Se realizaron búsquedas en las siguientes bases de datos: Pubmed, Web of Science y Google Scholar. Se realizó una búsqueda con los siguientes criterios: (a) fuerza isométrica; (b) abducción de cadera; (c) dinamometría y (d) protocolos de evaluación. Los criterios de inclusión fueron: (a) artículos científicos publicados entre 2004 y 2023; (b) uso de dinamometría; (c) evaluación de la FIM de la ABDC; (d) estudios con adultos sanos o deportistas; y (e) inclusión detallada del protocolo de medición. Se excluyeron estudios con sujetos patológicos o sin especificación técnica del procedimiento. En total, se seleccionaron 12 artículos tras un proceso de cribado y evaluación metodológica básica.

Resultados e Conclusões/Resultados y Conclusiones

Resultados. La evaluación de la FIM de los ABDC se organizó en tres grandes grupos: decúbito supino (DS), decúbito lateral (DL) y bipedestación (BP), con subvariantes en la flexión articular de la rodilla y cadera (neutra, 45º o 90º) y ubicación del dinamómetro proximal, en el cóndilo femoral lateral de la rodilla (CLFR) o distal en el maléolo lateral del tobillo (MLT). Se observó que la posición en DS con aplicación en rodilla ofrece una

mayor estandarización y control del segmento proximal, mientras que el DL mejora la activación funcional y permite medir contra gravedad. Por otro lado, la BP simula mejor las actividades cotidianas o deportivas, pero introduce mayor variabilidad por requerir equilibrio. Conclusión. Se puede destacar que la posición elegida y el punto de aplicación del DM influyen significativamente en la FIM registrada. Las posiciones más funcionales, como el DL con flexión o la BP, ofrecen ventajas para contextos deportivos, mientras que las posiciones más controladas, como DS, son más adecuadas para evaluaciones más sencillas y fiables. Asimismo, es fundamental considerar la influencia del examinador durante la medición, promoviendo la formación estandarizada del personal y, cuando sea posible, el uso de sistemas de fijación externa para minimizar errores.

Keywords: Cadera; dinamometría; valores de referencia; riesgo de lesión.

Trabajo descriptivo de cómo los cuatro ciclos de la menstruación afecta la fuerza en distintas atletas

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Introdução/Introduccion

Las variaciones hormonales del ciclo menstrual afectan el rendimiento deportivo femenino (Meignié et al., 2021; Miyazaki & Maeda, 2022). La mayoría de los estudios se centran en hombres, dejando un vacío en la investigación (Pallavi et al., 2017). Se ha observado que fuerza y fatiga varían según la fase menstrual (Meignié et al., 2021). Este estudio analiza cómo el entrenamiento de fuerza se relaciona con esas fases para optimizar el rendimiento (Miyazaki & Maeda, 2022).

Métodos/Metodologia

Este estudio cuantitativo y experimental evaluará la aceleración en levantamiento de pesas durante distintas fases del ciclo menstrual durante dos meses. Participarán entre 11 a 20 mujeres entre 18 y 35 años, con ciclos regulares y sin uso de anticonceptivos. Se registrará el ciclo mediante la app Clue® y se medirá la aceleración con el acelerómetro T-FORCE V2. El protocolo incluye familiarización, calentamiento específico y control de fatiga mediante la escala RPE (Wilson et al., 2025; Zhao et al., 2023). Los datos se analizaron con estadística descriptiva y ANOVA de medidas repetidas, buscando correlaciones entre aceleración y fases hormonales. Se cumplirán todos los principios éticos y de consentimiento informado.

Resultados e Conclusões/Resultados y Conclusiones

Resultados: Se compararon las fases del ciclo menstrual en cuanto a la aceleración en levantamiento de pesas. La mayor diferencia positiva se observó entre la fase folicular y la ovulatoria (0.08078 m/s2). Las diferencias entre folicular y lútea (0.03408 m/s2), y entre folicular y menstruación (-0.03242 m/s2) fueron menores. Adicionalmente, se observó que el valor de la variable d de Cohen cuando se comparaba las fases lútea, folicular y menstruación, con la ovulatoria; arrojaba valores mayores o iguales a 0,8 siendo entonces una diferencia entre las medidas grande y que puede tener un impacto estadísticamente significativo. Conclusión: Los datos sugieren una mayor aceleración durante la fase ovulatoria en comparación con otras fases, lo que podría relacionarse con picos hormonales asociados a un mejor rendimiento. Proporcionando entonces, información valiosa para el entrenamiento de fuerza en mujeres, en donde se busque minimizar la fatiga y obtener un buen desempeño de la atleta. Pero además, se recomienda ampliar el tiempo de la toma de las muestras para así obtener más valores

estadísticamente significativos, que permitan seguir ampliando el conocimiento en esta área del entrenamiento de fuerza femenino.

Keywords: ciclo menstrual, entrenamiento de fuerza, aceleración, rendimiento deportivo.

Nível de prontidão para atividade física em atletas universitários de futsal masculino de um torneio da (UFV)

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Introdução/Introduccion

O Questionário de Prontidão para Atividade Física (PAR-Q), originalmente proposto por Shephard em 1988, foi desenvolvido para identificar indivíduos para os quais a prática de atividade física pode ser inadequada ou que necessitem de orientação médica antes de iniciar os exercícios. O questionário é composto por sete questões dicotômicas (sim/não) que avaliam fatores como condições cardíacas, episódios de desmaio, problemas musculoesqueléticos e idade. Este estudo teve como objetivo avaliar o nível de prontidão para a atividade física entre atletas de futsal masculino participantes de um torneio universitário.

Métodos/Metodologia

Este estudo foi aprovado pelo Comitê de Ética em Pesquisa com Seres Humanos da Universidade Federal de Viçosa (UFV). Um total de 54 atletas, participantes do torneio de futsal no Campus Florestal da UFV, foram recrutados. O PAR-Q foi aplicado presencialmente por meio de um link do Google Forms, mantendo todas as perguntas originais da publicação de 1988. Foram coletados dados antropométricos para caracterização da amostra: idade ($20 \pm 1{,}86$ anos), peso ($69{,}4 \pm 10{,}34$ kg) e altura ($1{,}80 \pm 0{,}07$ m). A análise dos dados foi realizada por meio de estatística descritiva.

Resultados e Conclusões/Resultados y Conclusiones

Quatro atletas (7,41% da amostra) foram considerados não aptos para a prática de atividade física, tendo respondido “sim” a mais de uma pergunta do PAR-Q. Esse percentual é relativamente baixo quando comparado a outros estudos, que apresentam taxas de inaptidão em torno de 40%. Os itens mais frequentemente assinalados foram: “Algum médico já disse que você tem problemas cardíacos?”, “Algum médico já lhe disse que sua pressão arterial é muito alta?” e “Algum médico já lhe disse que você tem algum problema ósseo ou articular, como artrite, que foi agravado pela prática de exercícios ou que poderia piorar com o exercício?”. Com base nesses resultados, conclui-se que o nível de prontidão para a atividade física entre os atletas de futsal masculino deste torneio universitário é elevado (92,59%). Os achados contribuem para o desenvolvimento de estratégias de planejamento e instrução a serem aplicadas em ambientes práticos da educação física.

Keywords: Questionário; Atividade Física, Saúde

EFECTOS DE UN PERÍODO DE DESENTRENAMIENTO TRAS UNA INTERVENCIÓN DE ENTRENAMIENTO DE FUERZA CON DIFERENTES UMBRALES DE PÉRDIDA DE VELOCIDAD SOBRE LAS PROPIEDADES CONTRÁCTILES DEL VASTO LATERAL

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Introdução/Introduccion

La pérdida de velocidad (VL, por sus siglas en inglés) se ha establecido como una métrica para determinar la fatiga inducida durante el entrenamiento de fuerza (RT) (Sánchez-Medina y González-Badillo, 2011). En cuanto a las adaptaciones a largo plazo, se sabe que un umbral de VL más alto provocaría disminuciones en las propiedades contráctiles de los músculos extensores de la rodilla (Pareja-Blanco et al., 2020). Sin embargo, no existe evidencia sobre los efectos residuales de la VL en las propiedades contráctiles después de un período de desentrenamiento. Por lo tanto, el objetivo de este estudio fue comparar los efectos de dos programas de RT con diferentes umbrales de VL (es decir, 20% vs. 40%) sobre las propiedades contráctiles del vasto lateral después de una intervención de RT y un período de desentrenamiento

Métodos/Metodologia

Cuarenta y cuatro hombres físicamente activos siguieron un programa de entrenamiento de fuerza (RT) de 8 semanas basado en el ejercicio de sentadilla completa (SQ), con un total de 16 sesiones. Los sujetos fueron asignados aleatoriamente a dos grupos de intervención que diferían en la pérdida de velocidad (VL) alcanzada dentro de la serie (VL20: 20%; VL40: 40%). La intensidad relativa (65-80% de 1-RM), la recuperación entre series (4 minutos) y el número de series (3) fueron iguales para ambos grupos. Los sujetos fueron evaluados en tres momentos: antes del entrenamiento (PRE), después del entrenamiento (POST) y tras 3 semanas de desentrenamiento (DET), utilizando Tensiomiografía (TMG). Se evaluaron las siguientes variables: desplazamiento radial máximo (Dm), tiempo de contracción (Tc), tiempo de retraso (Td) y velocidad de deformación (Vd).

Resultados e Conclusões/Resultados y Conclusiones

RESULTADOS: No se observaron interacciones significativas “grupo x tiempo”. Se encontraron efectos significativos del factor “tiempo” para todas las variables analizadas mediante TMG. La Vd y el Dm aumentaron significativamente después del período de desentrenamiento en ambos grupos. CONCLUSIONES: A pesar del nivel de fatiga inducida, tras 3 semanas de desentrenamiento, tanto el Dm como la Vd aumentaron, lo que refleja un descondicionamiento estructural del músculo. Esto sugiere que los músculos se volvieron más blandos y menos eficaces en su respuesta después de la interrupción del entrenamiento.

Keywords: Fatiga, Entrenamiento basado en la velocidad, TMG, Propiedades Contráctiles

Nível de prontidão para a prática de exercício físico em atletas universitárias de futsal da UFV

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Introdução/Introduccion

Desenvolvido como uma ferramenta de triagem pré-exercício, o Physical Activity Readiness Questionnaire (PAR-Q) facilita a identificação de indivíduos que podem necessitar de avaliação médica antes de iniciar programas de treinamento. Essa avaliação é composta por sete itens de resposta binária que avaliam fatores de risco cardiovascular, histórico de síncope, limitações musculoesqueléticas e considerações relacionadas à idade. O presente estudo teve como objetivo avaliar o nível de prontidão para a prática de atividade física em atletas universitárias de futsal que participam de competições interuniversitárias.

Métodos/Metodologia

Treze atletas competitivas de futsal do Campus Florestal da Universidade Federal de Viçosa participaram deste estudo. O PAR-Q padronizado foi aplicado digitalmente durante sessões previamente agendadas com a equipe, mantendo todos os itens originais da versão de 1988. Foram registrados dados antropométricos, incluindo idade ($22 \pm 3{,}66$ anos), massa corporal ($58{,}91 \pm 9{,}62$ kg) e estatura ($1{,}61 \pm 0{,}04$ m). O estudo foi aprovado pelo Comitê de Ética em Pesquisa com Seres Humanos da UFV (UFV-CEPH). A análise dos dados foi realizada por meio de estatística descritiva básica.

Resultados e Conclusões/Resultados y Conclusiones

Cinco atletas (38,46% da amostra) apresentaram múltiplas respostas positivas, indicando necessidade de restrição à prática de exercícios, em conformidade com estudos anteriores que relatam taxas de inelegibilidade de aproximadamente 40%. Os problemas mais frequentemente relatados incluíram episódios recorrentes de tontura, hipertensão diagnosticada por profissional médico e dores articulares agravadas pela atividade física. Uma taxa de liberação de 61,54% para participação irrestrita sugere lacunas notáveis na prontidão dessas atletas universitárias. Esses achados ressaltam a importância da implementação de protocolos de treinamento direcionados e de triagens de saúde abrangentes antes da participação em programas esportivos universitários.

Keywords: PAR-Q, atividade física, avaliação pré-participação, atletas universitária